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MENDING FENCES AT&T WorldNet's Michael Chaplo is tackling problems plaguing the ISP. Page 21.

DOMINO'S DELIVERS Domino's Matt Maguire has built one hot and wild network. Page 16.

The newsweekly of enterprise network computing

# NetworkWorld

SELLING IPv6

'Net leaders form advocacy group. Page 8.

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The network portal: www.nwfusion.com

## Gigabit choke points:

Gigabit Ethernet can be used to enhance network performance, but the technology may not be the panacea you expect. Our tests show a host of factors conspire to lower network throughput, sometimes to shockingly low levels. Page 35.

JACK GALLAGHER

NetworkWorld REVIEW

REVIEW: Vinca's Co-StandbyServer tops our tests of five Windows NT clustering applications. Page 39.

REVIEW: In our tests of four NFS gateways for Windows NT Server, Hummingbird's product flew to the top of our Scorecard. Page 43.

# Microsoft's Babylon rebuilds SNA Server

*New Babylon server bolsters connectivity between Windows, legacy apps.*

BY JOHN FONTANA

Microsoft is finally beginning to shake its Windows-centric attitude in favor of becoming an equal partner in heterogeneous enterprise networks.

In a couple of weeks, the company will reveal details about the next version of SNA Server, code-named Babylon. The details will show how Microsoft plans to integrate its Distributed interNet Application (DNA) architecture with mainframe, AS/400 and Unix environments. The goal is to create a bidirectional gateway for Windows users that bridges DNA and non-DNA environments. DNA is an architecture based on Component Object Model (COM), a software framework for creating objects that is used to build distributed Internet applications.

Babylon will also add some 27 enhancements — and 600,000 new lines of code — to the existing SNA Server package, including better legacy-application access and im-

See **Microsoft**, page 12

Microsoft's Vesa Suomalainen says Babylon reuses SNA Server code but has many new features.

# Is Lucent wise to the enterprise?

BY DAVID ROHDE

*AURORA, COLO.* — You only have to look at Lucent's just-completed acquisition of Ascend and recent multimillion dollar bid for IP router vendor Nexabit to figure out Lucent's No. 1 priority: the carrier and ISP equipment market.

But Lucent officials say they're committed to the enterprise data network market for the long run, insisting the company's current enterprise product lineup will continue to expand beyond mostly high-end Ethernet and ATM switches. They also say

See **Lucent**, page 56

More Online

- See what other telecom vendors, such as Nortel and Alcatel, are doing to break into the U.S. internetworking market.
- Take a look at how internetwork vendors, such as Cisco, are trying to fend them off.

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# 3Com captain remains calm despite stormy forecasts

BY JIM DUFFY

*MARLBOROUGH, MASS.* — 3Com faces a number of major challenges as it moves to diversify its product portfolio.

In an exclusive interview with *Network World* at 3Com's new East Coast operations headquarters, company President and CEO Eric Benhamou defended the absence of a core product around which to build an information access infrastructure. He also reiterated the synergy he claims exists between 3Com and US Robotics, the modem giant 3Com acquired two years ago for $7 billion that many analysts are now saying the company should sell.

Benhamou also says quarterly revenue growth in fiscal 2000

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NetworkWorld Q3A

Robert Metcalfe, inventor of Ethernet, and other industry luminaries ponder network industry evolution. PAGE 57

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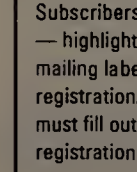
## THIS WEEK ONLINE

**Finding specific stories.** Our new search engine (see page 30 for more details) has a handy feature: If you are looking for an electronic copy of a specific *Network World* story, you can now get right to it. Here's how: In the search box on any page, type **title: "words from the headline"** (substituting all or part of the headline). That'll bring up a link to the story. The system currently has all *Network World* stories for 1999 and 1998; we're working to extend it even further back.



**Water cooler.** Beth Schultz, executive editor of our Signature Series, got digital subscriber line to her home office a few months back. She says she'll never settle for anything less again. Read why. **DocFinder: 3630**

**Dial-up routers.** From a reader: A newly installed dial-up Cisco router authenticates users but doesn't let them check e-mail or get onto the Internet. Suggestions? See what others have proposed, then add your advice. **DocFinder: 3643**

**Beep.** "On a standard vanilla server running NT 4.0 SP3 (SBS), a ctrl-alt-del on a locked screen brings up the login window, but subsequent attempts to type a login name or password yield only beeps." Any suggestions for this perplexed user? **DocFinder: 3642**

**Boomerang employees.** As the shortage of skilled IT workers continues, some firms have begun offering fairly hefty bonuses to employees who left, to try to entice them back. Are you one of these "boomerangers," or have you used this technique yourself to (re)hire the workers you need? Let's talk about it in a forum. **DocFinder: 3644**

**How to get onto Network World Fusion**

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

NetworkWorld

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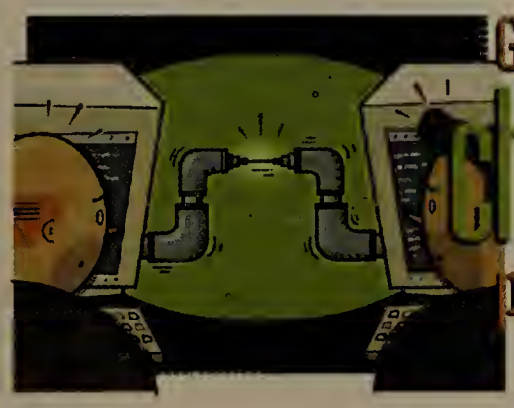
## FEATURES

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# NEWS BRIEFS, JULY 5, 1999

### FCC put SBC's feet to the fire

SBC Communications is willing to risk more than $2.2 billion in return for permission to buy fellow regional Bell operating company Ameritech. SBC and the Federal Communications Commission last week agreed to a set of conditions that SBC will meet if the FCC blesses the $78 billion merger. SBC agrees to pay up to $1 billion in fines if it fails to treat competitors fairly and another $1.2 billion if it fails to expand service offerings into 30 new markets within 30 months after the deal closes. The conditions were drawn up between SBC and the FCC and are open to public comment before the commissioners vote on them.

### SEC casts an eye at Microsoft

Microsoft has fallen under the government microscope once again, this time at the U.S. Securities and Exchange Commission. The SEC has requested information from Microsoft as part of an investigation into the software giant's accounting practices as they relate to financial reserves and reserve policies. The software maker is cooperating, according to Chief Financial Officer Greg Maffei. In an unrelated development, Maffei says Microsoft will reclassify revenue and costs in four business units that will result in a $761 million increase in revenue for the first three quarters of fiscal 1999. In other words, the rich keep on getting richer.

### Cisco writes another check

Those shopaholics at Cisco were busy again last week. This time the acquisition is a privately held semiconductor company, StratumOne Communications in Santa Clara, Calif. The price: $435 million. Founded in 1997, StratumOne will give Cisco the silicon technology necessary to let service providers build new data networks with enhanced price and performance, the company says. Cisco acquired a stake in StratumOne earlier this year, and the companies have been working together on 10G bit/sec technology for routers. The acquisition, Cisco's 35th since 1993, is expected to close in the first quarter of Cisco's fiscal year 2000.

### Truckers are Web surfers, too

These guys really do ride the information superhighway: Park 'N View, a telecommunications and entertainment services provider for long-haul truckers, announced last week it is changing its name to PNV.net. As part of the change, the company announced a new Web portal for trip routing, load posting, fuel pricing and other personalized services for truckers. PNV.net offers in-cab cable, telephone and dial-up Internet access to truckers at 220 rest stops across the country. The company has built a private backbone with Cisco routers and servers stationed at the truck stops and T-1 lines providing connectivity back to PVN.net's Coral Springs, Fla., headquarters. Using frame relay and voice-over-IP technology, the company provides long-distance phone service and 56K bit/sec dial-up Internet access. This stuff should be in a "Smokey and the Bandit" remake.

**Truckers plug in to the Park 'N View service, which offers in-cab cable TV and 'Net access.**

### Tech leaders hedging their bets

Texas governor and presidential hopeful George W. Bush was warmly greeted by high-tech executives at a Silicon Valley fund-raiser last week. Attending the event were Cisco CEO John Chambers, Microsoft Executive President Robert Herbold, Oracle President Ray Lane, Intel chair Gordon Moore, Hewlett-Packard President Lew Platt, and eBay President Meg Whitman.

With all of Bush's talk about "taking the side of innovation over litigation," we can understand how Microsoft, now at war with the U.S. Department of Justice, would embrace Bush. Platt and others have long been in the Republican camp. However, it's harder to explain Chambers and Whitman, who were spotted just a few months ago chumming it up at the White House with Vice President Al Gore, himself a presidential candidate. Is the idea to bet on more than one horse?

### Tellabs buys NetCore for $575M

Tellabs, one of the world's largest network equipment makers, is buying NetCore Systems for $575 million in stock to help Tellabs build new optical networks that carry data, voice and video traffic. NetCore's main product, the Everest Integrated Switch, combines IP routing and ATM switching into a single device that directs Internet, voice and video traffic. The device will help Tellabs meet the growing demand for network products that carry voice and data traffic.

"NetCore's strengths in core IP routing, ATM switching and IP/ATM integration will help us provide technology for major carriers wanting to offer services over an integrated multiservice network," says Brian Jackman, president of global systems and technology at Tellabs.

# Give VPNs a test drive

*IRE gear lets users build VPNs incrementally.*

BY TIM GREENE

*BALTIMORE* — Information Resource Engineering (IRE) has a new family of virtual private network gear for customers who want to experiment with VPNs before making a big capital investment in VPN equipment.

SafeNet/Speed dedicated VPN hardware encrypts LAN traffic so it can be securely sent across IP nets, including the Internet, and is designed so VPN neophytes can test it inexpensively on a small scale.

If users like what they see, they can then boost the performance of the gear with hardware and software add-ons that can support more users.

"A lot of people are in pilot mode right now and are not looking to hugely invest in VPNs," says Jeff Wilson, an analyst with Infonetics Research, a market research firm in San Jose. Infonetics just issued results of a survey asking 225 enterprise network professionals who specialize in remote access what their plans were for using VPNs.

The SafeNet/Speed gear is attached to a corporate LAN and encrypts designated traffic as it passes through the box. The equipment also establishes IP tunnels with other IRE-compatible devices. That lets customers use the Internet to securely connect corporate sites and allows for remote access over the Internet.

The SafeNet base model, Speed-FE, processes packets at up to 1.5M bit/sec, or fast enough to handle about 100 encrypted tunnels, IRE says.

The mid-level model, Speed-RFE, processes packets at up to 10M bit/sec or about 1,000 tunnels. And at the high end, Speed-SFE handles up to 45M bit/sec or up to 4,000 tunnels.

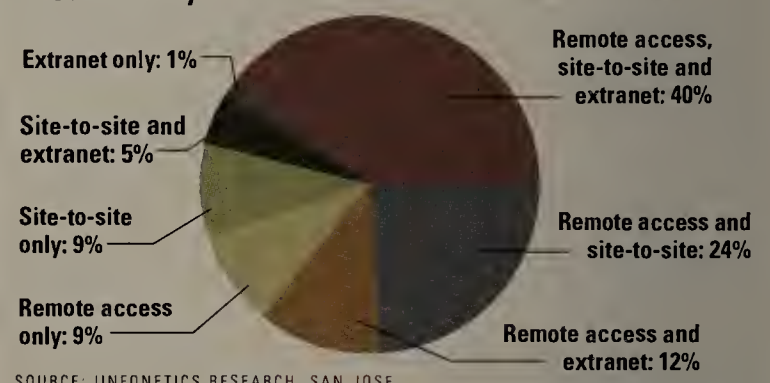
Upgrading the FE to the RFE or SFE requires opening the box to install an additional processing card and new software, says Sherry Quinn, Speed product manager. The gear supports IPSec-Plus, IRE's version of the IP Security standard for authentication, tunneling, encryption and key management.

Speed-FE costs $1,295 and is available now. Speed-RFE costs $4,995, and Speed-SFE costs $9,995. Both will be available in September. Upgrading from Speed-FE costs $3,895. The price for upgrading to Speed-SFE has not been set.

IRE: www.ire.com

## How VPNs will be used

**A recent survey shows how 225 users will build their VPNs:**




SOURCE: INFONETICS RESEARCH, SAN JOSE

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**This week's question:**

Which company has acquired the following firms this year: Access Software, CompareNet and Jump Networks?

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# Cabletron unveils dial-up remote access gear

*SSA 700 line can identify applications across PPP links.*

BY JIM DUFFY

*ROCHESTER, N.H.* — Cabletron last week announced dial-up remote access concentrators that let users securely share information with co-workers, business partners and across the Internet.

The SmartSwitch Access (SSA) 700 line lets users define security policies on traffic flows and establish network access policies based on the type of application entering or exiting the network. This is made possible by the products' ability to recognize Layer 4 packet information across dial-up PPP connections, Cabletron claims.

The SSA 700 line is targeted at enterprise network users and small to mid-size service providers. It supports 48 to 60 simultaneous ISDN and V.90 56K bit/sec modem sessions across one or two ISDN Primary Rate Interface (PRI) T-1/E-1 speed lines.

The SSA 700 products are also available as High-Speed Interface Modules (HSIM) that slide into Cabletron's SmartSwitch 2000, 6000 and 9000 platforms. That means a single SmartSwitch platform can scale from 24 to 780 dial-up connections using SSA HSIM modules.

The Layer 4 flow identity information is the key to the product line, analysts say. Even though Cabletron competitors such as Cisco and 3Com can also identify applications based on Layer 4 packet information, Cabletron's advantage lies in the Spectrum Connection Services Manager (CSM) management application that presents the information, analysts say.

CSM provides user authentication, authorization and accounting at the PPP level, as well as IP flow accounting, flow policy definition and flow policy violation logging.

"Really being able to get down to determining whether the application is HTTP or [File Transfer Protocol] or TCP/IP — that's unique," says Matt Davis, an analyst at The Yankee Group in Boston. "If you're an executive who wants to find out how much time your employees are spending on the Web vs. transferring files or sending e-mail, you can do that."

This information can also be used to determine whether to block certain traffic from entering or exiting the network, or to upgrade WAN lines to increase performance and productivity, Davis says.

Spectrum CSM supports the Remote Authentication Dial-In User Service (RADIUS) authentication and accounting protocols, which let the application gather data from multivendor remote access server devices. CSM also provides authentication proxies to simplify integration with non-RADIUS authentication environments, Cabletron says.

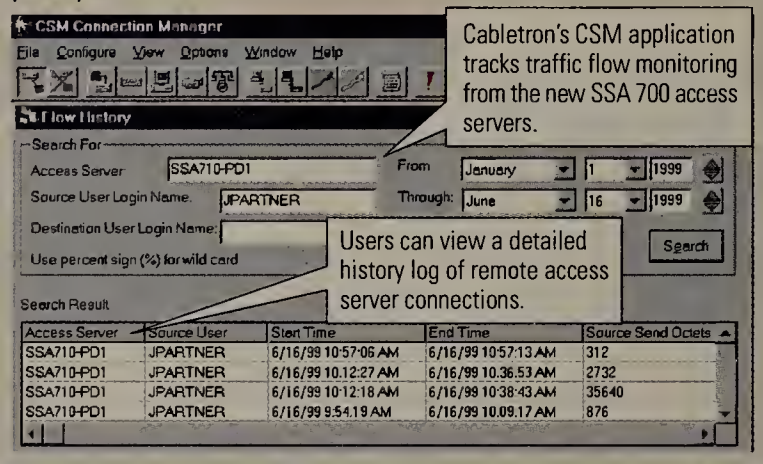
The SSA 710-48 Stackable Remote Access Concentrator features two ISDN PRI/T-1 ports, 48 V.90 digital modems and redundant power. It costs $11,995. The SSA 720-60 supports 60 modems and costs $13,995. Both products will ship in August. The HSIM modules are priced from $8,495 to $13,495. A single-port ISDN version with a WAN expansion slot is available now; dual-port ISDN models will ship in August.

WAN interface expansion modules cost $495. The T-1 version will ship this month; E-1 models will ship in August.

Cabletron: www.cabletron.com

## Flow control

**Features of Cabletron's Spectrum Connection Services Manager (CSM) software:**




# Sun strives for easier Java data access

BY JOHN COX

Sun is pulling out the stops to simplify Java's access to networked databases.

While Java can help developers write applications faster, that doesn't do them much good unless the programs they write can easily work with transactional data in distributed databases from the likes of Oracle and Sybase.

Sun's efforts are being made at three levels: improving the basic Java Database Connectivity (JDBC) interface; releasing a final version of JavaBlend, which automatically creates JDBC code; and creating a high-level Java standard, tentatively called Java Data Objects (JDO), that works with back-end databases.

JDO has been kept at a low profile to date, but it is backed by key Sun partners such as Oracle, Sybase and BEA Systems. The initial draft of JDO is being publicly reviewed by programmers and vendors in the Java Community Process, which draws up new Java standards.

JDO describes a standard way to store Java objects in transactional databases and a standard way to represent those databases as Java objects. The description will be incorporated by vendors into databases and development tools.

JDO may not be completed until mid-2000. In the meantime, the main mechanism for accessing back-end data is the JDBC API.

"It's a simple database-independent API for accessing relational data stores and, theoretically, is platform-independent," says Rick Bullotta, chief technology officer for Lighthammer Software Development Corp., a Malvern, Pa., software vendor. "It makes Java a much more viable alternative to things such as Microsoft's Active Server Pages for data-intensive Web applications."

JDBC 3.0 will offer improved performance and support for XML. Today, Bullotta says, it's pretty easy to take a JDBC database response and present it in an XML document.

But JDBC 3.0 could greatly simplify this process in the reverse direction, in effect translating XML documents into Java objects that in turn would interact with relational data.

### Refining JavaBlend

JavaBlend is a Sun product that shipped a year ago as a "developer's release." It was OK for programmers to experiment with but was not suitable for "bet-your-business" production applications. Sun plans to release a production version of JavaBlend later this year.

JavaBlend basically lets Java programmers see all data as if it were Java objects. It scans a database schema and then cre-

See **Java**, page 12

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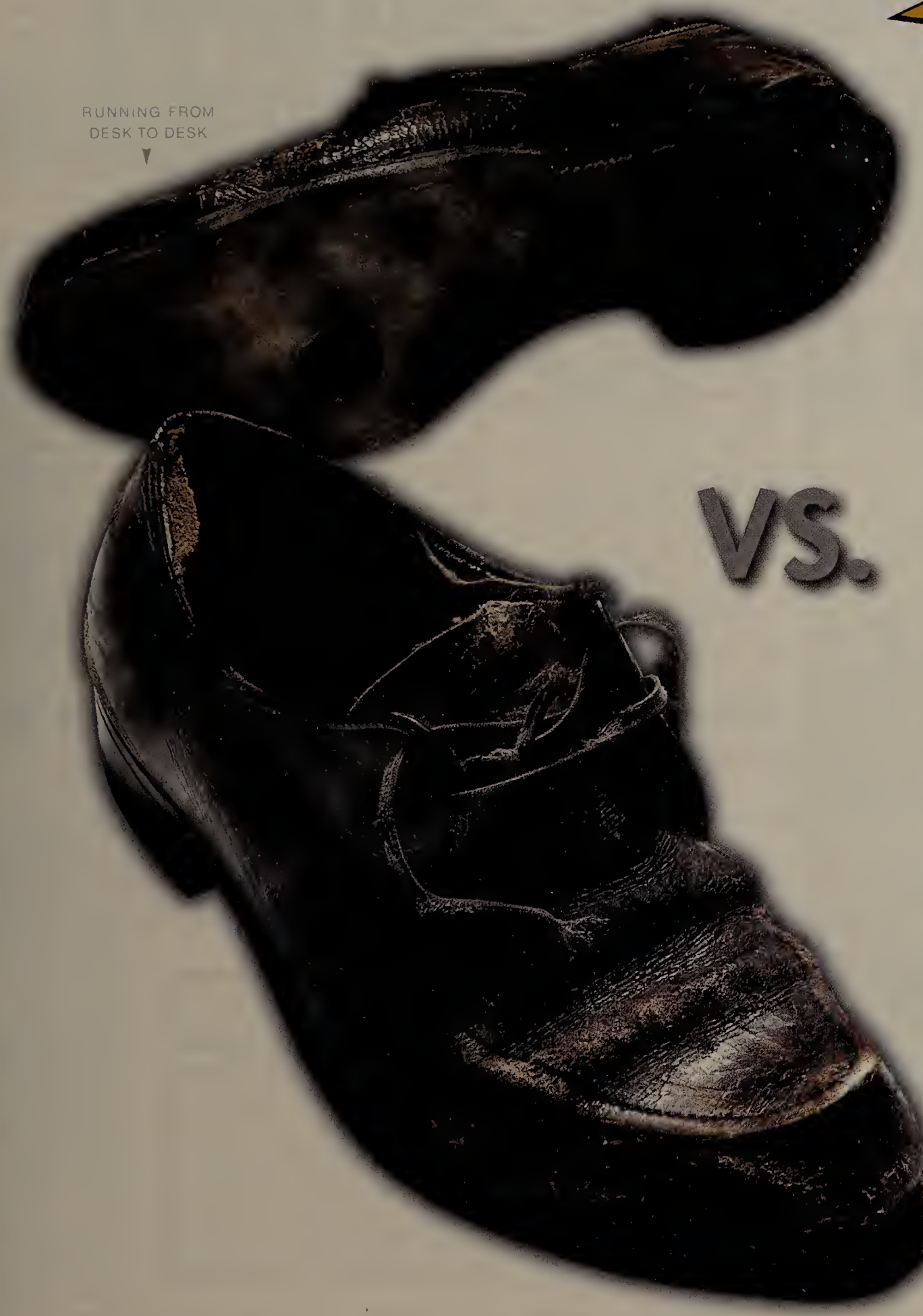

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# New advocacy group to drive next-generation IP protocol

BY SANDRA GITTLEN

The IPv6 Forum, which counts among its founding members MCI WorldCom, has a simple goal: to educate people about and promote awareness of Internet Protocol Version 6.

The group, which will be announced this week, wants to show off the benefits of this technology, including end-to-end security, quality of service and support for embedded devices (see Scoop, this page).

IPv6 is the next iteration of the Internet communications protocol.

"The biggest detriment to IPv6 has been ignorance" on the part of vendors and users, says Latif Ladid, forum president and head of Telebit Communications in Denmark. He admits that switching over from current IPv4 implementations will take time, but he says it's better to do that now, before IPv4 begins to fail. Already IPv4's limitations are inhibiting the rollout of security on mobile devices because they require unique IP addresses, of which IPv4 is running low.

So far, 37 companies have signed on to participate in the forum, including such heavyweights as 3Com, Cisco, Microsoft, Nokia, Sprint, Ericsson and Nippon Telephone and Telegraph.

To join the forum, companies must pledge to create IPv6 products and support the technology's widespread adoption.

The forum expects to see IPv6-enabled products, such as IPv4 to IPv6 transition applications and router upgrades, make their way into user networks as early as next year.

The forum will be working in tandem with the Internet Engineering Task Force (IETF), which will meet later this month to work on the IPv6 protocol and a transition strategy. "The IETF working group's charter is to set a protocol," Ladid says. "Once that work is done, the group is folded." The forum will be a consistent advocate for IPv6 in the marketplace, while the IETF continues to tackle the technology issues.

The IETF has already tried to generate momentum for the protocol but to no avail. Except for research test beds, such as the 6bone network that vendors are using to test interoperability, the protocol has seen little use. Instead, users have embraced workarounds for IPv4, such as IP Security, Multi-protocol Label Switching and Differentiated Services. And, if users aren't beating down the door for services, vendors are hesitant to invest the time and money to develop the gear.

3Com CEO Eric Benhamou says his company has developed IPv6-enabled products, "but customers haven't turned [IPv6] on." He says the killer application for IPv6 will be mobile devices. Today's IP address space is too complicated to support mobile users, he says, so companies need to move to IPv6.

Ladid agrees, adding that the lure of IPv6 will prove too great for even reluctant users. There are applications that can't be rolled out because of IPv4's limitations.

For instance, with IPv6's built-in quality of service, network managers will be able to automatically and intelligently allocate bandwidth so that users only pay for what they use.

IETF Chair Fred Baker says the switchover won't happen overnight. Instead, users will have to run parallel operations for at least a few years. ◪

## The Scoop

*The news behind the news*

### IPV6: MUCH ADO ABOUT SOMETHING

Proponents call IPv6 a cure-all: The technology promises end-to-end security, a never-ending supply of IP addresses and quality of service beyond what we think of today. So if this protocol is so great, why isn't anyone using it?

The answer is in the deployment. The rollout of IPv6 has been challenging, to say the least. Hardware has to be updated, IPv6-enabled applications created, transitional gear developed and infrastructure put in place to handle the switchover. Moreover, parallel networks have to be managed while users phase out of IPv4 and into IPv6.

But the pain should be worthwhile, experts say. The next-generation Internet powered by IPv6 will make today's IPv4 networks seem like a nightmare we survived.

Here are just a few of the benefits of IPv6:

- More addresses. As more users around the world head online and try to make a go of e-commerce, IP addresses will be depleted. Staying with IPv4 and its 32-bit address space means limiting Internet users to 4 billion possible addresses. As embedded devices begin to infiltrate the market, they will each need their own IP address. Four billion addresses will suddenly seem paltry. IPv6 provides for more than 340 trillion addresses, according to experts.
- Improved security. Although IPv4 is not a security risk, the workarounds that users have implemented to avoid the address shortage are a problem. Network address translators let network managers aggregate traffic and send it out over the 'Net using a single IP address. This method breaks the IP Security protocol, which requires end-to-end transmissions. Because IPv6 provides enough addresses for each device, end-to-end security is guaranteed.
- Quality of service. Vendors and service providers are just starting to deploy quality of service with IPv4. Because IPv6 has built-in quality of service, network managers will be able to assign users access to network services via applications based on priority and availability. This will pave the way for multicasting, pay-for-what-you-use and premium services.

Getting IPv6 networks off the ground may take a while, but it'll be worth the effort, says Latif Ladid, president of the IPv6 Forum.

*— Sandra Gittlen*

# Long-distance carriers hike universal service fees

BY DAVID ROHDE

*WASHINGTON, D.C.* — AT&T and MCI WorldCom last week raised their controversial universal-service surcharges, taking a new bite out of users' budgets.

The moves were in response to the Federal Communications Commission's recent decision to increase funding for the E-rate program, which subsidizes network services at schools and libraries.

AT&T made the larger move, putting its new surcharge at 4.9% for all business users, compared with 4.5% for MCI WorldCom's enterprise users, though MCI instituted a much higher percentage charge for small businesses.

MCI WorldCom defines most enterprise-level customers, even those outside the typical Fortune rankings, as large businesses for purposes of assessing the surcharge.

Sprint left its surcharge alone, at least for now. A spokeswoman says the company is still evaluating the situation.

The universal-service fees generally apply to voice and legacy data services, such as private lines and frame relay.

They do not apply to Internet traffic, Internet access lines or related services, such as IP virtual private networks.

**Doling out more**

**Two of the Big 3 long-distance carriers raised their universal-service surcharge:**

| Carrier | Old surcharge | New surcharge |
|---|---|---|
| AT&T | 4.1% | 4.9% |
| MCI WorldCom* | 4.1% | 4.5% |
| Sprint | 4.9% | 4.9% |

* For large business customers. The small-business surcharge was raised from 5.0% to 6.5%.

The fees also generally do not apply to any intrastate telecom traffic, but they do apply to interstate domestic as well as international traffic.

The carriers say the fees are going up because the FCC is now funding E-rate at $2.25 billion per year, rather than the previous $1.3 billion per year, and the carriers say they have to make up the subsidy somehow.

But the companies timed the moves to coincide with a possible offsetting event that take places every year on July 1 -- a reduction in access fees that local carriers charge long-distance carriers to complete connections.

That rate reduction, mandated by the FCC as part of a multiyear access-reform plan, totals $824.8 million industrywide for the year starting July 1.

The question is whether long-distance carriers will pass along the access-rate reductions. The universal service fee is now levied directly on users.

The long-distance carriers claim they do pass along the access-rate reductions — in the form of lower long-distance rates.

In fact, the carriers say that in the case of large enterprise users they sometimes factor in future July 1 access-rate reductions as part of long-term negotiated contracts. ◪

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# From tanks to T-shirts, gov't e-commerce grows

BY ELLEN MESSMER

*WASHINGTON, D.C.* — Despite missteps in the past, such as mandating electronic data interchange for all electronic commerce as the World Wide Web was just emerging, the federal government is proving it can do business electronically as well as anyone else.

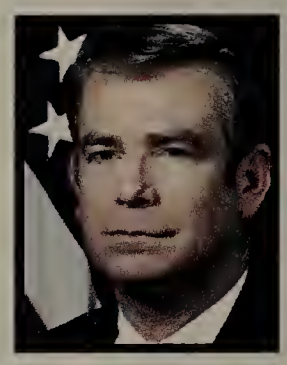
The Department of Defense, General Services Administration and other federal agencies swapped stories about their electronic commerce achievements and challenges last week at the E-Gov '99 conference in Washington, D.C.

The Defense Department now maintains several Web-based catalog sites where military personnel can order everything from tanks to T-shirts from anywhere in the world.

The General Services Administration boasts GSA Advantage, where all federal agencies can choose among thousands of office stock items. And the Department of the Treasury now collects two-thirds of taxes electronically from more than 2 million corporations and pays half of its bills that way, too.

But that doesn't mean it's been easy or that problems don't abound. Take the Defense Department, which is being forced by Congress to ensure "a single face to industry" among electronic catalog sites run by assorted agencies, including the Defense Logistics Agency, the U.S. Army and the Navy. In the most recent Defense Appropriations bill, Congress ordered some improvements on that score.

The idea is that the government should act with its trading partners in a consistent way from department to department, "and that hasn't been achieved," acknowledges Paul Grant, an electronic commerce director with the Defense Department.



**The Feds need a consistent way to communicate with trading partners, Grant says.**

The plan now is to have the Defense Logistics Agency's eMall Web catalog become the central point, with other defense agency catalog sites linked behind it.

The Defense Department also wants to come up with a way for users to use a single shopping cart and conduct searches across multiple catalog sites.

The need for such cross-searches is spurring government interest in the Extensible Markup Language (XML), which enables Web site providers to facilitate searches by identifying content with common tags.

By November, the government plans to complete tests of XML-based catalogs done by General Services, NASA and vendor CommerceNet.

"At that point, we'll have to decide if this is where the government wants to go," says Tony Trenkle, director of electronic services at the Social Security Administration.

If XML is the direction that is chosen, government agencies may be forced to meet certain XML requirements on their electronic commerce Web sites.

The government is also making progress in the area of procurement cards, also called p-cards. The Navy last week successfully completed its first Web transaction based on the government's SmartPay p-cards.

These p-cards — a special type of credit card that can set controls on what users purchase from which vendors — became available to 300,000 government employees last December under a General Services contract awarded to Citibank, First Chicago, Bank of America, Mellon Bank and U.S. Bank.

Web sites have to implement SmartPay software to complete a p-card transaction, and though this has been harder than expected, "we're pleased and the Navy is pleased," says Gary Callen, vice president of government card services at Citibank.

The General Services Advantage Web site already accepts the SmartPay p-card. ◪

# StorageTek trumpets storage outsourcing plan

*Storage Utility program makes local or remote pools of storage available on an as-needed basis.*

BY DENI CONNOR

*LOUISVILLE, COLO.* — Companies will save money by renting storage capacity rather than buying it, StorageTek officials said last week while announcing one of the first storage outsourcing programs of its kind.

Dubbed Storage Utility, the program allows customers to pay as little as $1 per megabyte, per month for the disk or tape storage they use.

With Storage Utility, users can choose from an assortment of disk, tape, backup and restore, and storage-area network (SAN) utility programs.

Musical content supplier RedDotNet is building a large repository of music and other digital content that it will distribute to retail stores. "The amount of storage we need as we start to build this network is in the many terabytes range," says Ray Alford of RedDotNet in Carlsbad, Calif. "We have projected the amount of storage we will use over time. StorageTek allows that amount to change depending on demand and lets us grow on an as-needed basis."

After an onsite analysis, StorageTek installed, configured and now manages the storage resources at RedDotNet. StorageTek will also lease remote storage to customers through partnerships with carriers and ISPs, such as Frontier GlobalCenter, Atrieva and WebVision.

Leasing storage as a utility is a relatively new concept. Start-up Storage Networks has a concept similar to StorageTek's, one that relies on reserves of storage in private storage points-of-presence. Storage Networks will also provide in-house storage and consulting services on a subscription basis.

"Small and mid-size businesses in particular will benefit from StorageTek's Storage Utility because they do not have the policies and procedures in place to manage their quickly increasing storage requirements," says Dave Hill, an analyst with Aberdeen Group in Boston. "StorageTek is focusing on an area that has been neglected before."

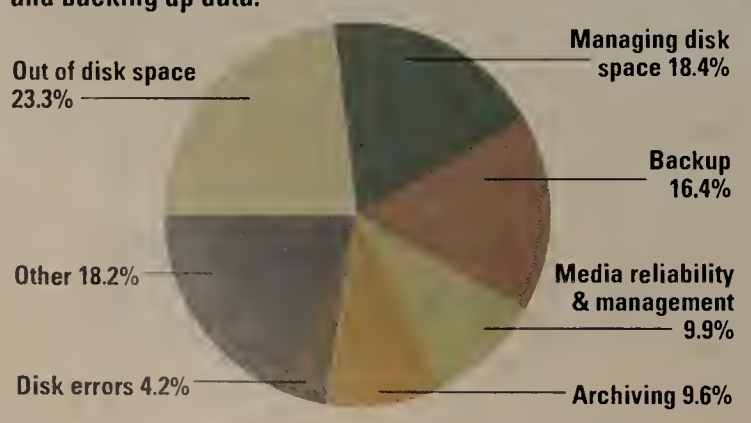
The Storage Utility contains:

- A Disk Utility, which lets network managers acquire as much disk storage as they want and return extra storage.
- Two tape utilities, one that leases tape storage and one that lets customers back up data to a remote tape library that is shared with other companies.
- A Backup and Restore Utility, in which StorageTek designs and implements a backup operation, and executes backups and restores regularly.
- A SAN Utility, in which StorageTek provides a Fibre Channel switch between the customer and its storage devices, allowing for faster transfer of data and alleviating traffic on the net.

StorageTek: www.storagetek.com

## Storage stumbling blocks

**According to a survey of 477 users, the three most common problems with storage are lack of space, managing storage and backing up data.**




SOURCE: STRATEGIC RESEARCH CORP., SANTA BARBARA, CALIF.

## Corrections

A recent story (*NW*, June 21, page 39) incorrectly stated the introductory price of Marimba's new DocService application. DocService will cost $750 per server and $75 per user through September, after which the price will be $1,000 per server and $100 per user.

Last week's feature on Windows 2000 (*NW*, June 28, page 1) should have stated that Microsoft will include support for Windows Internet Naming Service (WINS) in Windows 2000, enabling the new operating system to host legacy applications that currently employ the service.

A related article (*NW*, June 28, page 58) incorrectly listed the URL for FastLane Technologies. FastLane's correct URL is www.fastlanetech.com.

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**Figures assume 2:1 ALDC hardware compression. $1295 MSRP for internal kit.*

**Microsoft,**
continued from page 1

proved 3270/5250 SNA communications features.

Microsoft, however, is not developing Babylon from scratch. The company is pulling connectivity technology from its SQL Server — Microsoft Message Queue Server (MSMQ) — and crafting it into a product much like the company did with Office and BackOffice.

Microsoft is further acknowledging legacy systems as cornerstones in enterprise network environments and is rushing to make Windows more closely interact with them — rather than trying to replace them, according to company officials.

While SNA Server currently provides mainframe connectivity, the goal is to migrate data to Windows platforms.

Babylon's key feature is its ability to allow bidirectional application and data integration via COM Transaction Integrator (COMTI) and OLE DB. In essence, Babylon will become middleware that will not only let Windows-based applications access legacy data but will also allow legacy applications to extract data from Windows systems.

"The bidirectional feature is interesting and shows that Microsoft is starting to acknowledge that other environments will have a central role in the enterprise," says Tim Sloane, director of research for Internet infrastructure at Aberdeen Group in Boston. "That's something Microsoft has not said before."

Critics say that although Microsoft is finally beginning to talk integration, Babylon is a weak attempt at best.

Microsoft discussed Babylon at the company's recent TechEd conference, but few details were available. Early this month, Microsoft will post a Web site featuring white papers and a list of features.

The features include a host of COMTI enhancements. The most important, called Terminal Oriented Application Support, is a COMTI method that can bundle multiple 3270 screens into a single object.

Previously, developers were limited to single request inputs and outputs from the mainframe, a simple structure that only worked with about 15% of mainframe applications. Now developers can cull data from 3270 and 5250 data streams, which opens up a richer integration environment.

A number of other new features provide mainframe programmers with access to Windows environments.

The Host Initiated Transaction feature lets Customer Information Control Systems or Information Management Systems transactions invoke COM and COM+ components in the Windows environment. This capability lets a mainframe programmer invoke the same methods as a program running natively in a Windows environment.

Another feature uses IBM's Distributed Relational Database Architecture (DRDA) services to let mainframe and AS/400 databases make direct queries to Microsoft databases, especially SQL Server. DRDA is IBM's database access protocol. Those types of bidirectional features have not been available to mainframe developers in the past. Also, a new replication server will allow Oracle databases running on Unix and DB2 databases to replicate data to SQL Server.

While Babylon is focused on bolstering Windows communication with IBM and Unix resources, it also includes a software developer's kit to let other mainframe vendors bridge to Windows.

Microsoft is in talks with Unisys and International Computers Limited (ILC), according to company officials.

Babylon also will connect to Microsoft's forthcoming BizTalk Server, an XML-based product for connecting business-to-business electronic commerce sites.

Users are applauding the efforts.

"We want the ability to replicate data from the AS/400 to SQL Server," says John Gordon, senior systems analyst at Southern California Water Co. "We are developing an Internet billing system, and if we can interface from the outside to AS/400 that would eliminate a lot of development work."

Critics, however, say Babylon is a collection of existing Microsoft connectivity technologies with a few new features and a marketing spin thrown in.

For example, the MSMQ to MQ Series Bridge, which connects the two messaging middleware platforms, is available in SNA Server 4.0, and Babylon adds only minor security enhancements.

Critics also say the new components provide only base features that will need major enhancements from third-party vendors before Babylon can meet enterprise demands.

"They have collected a hodgepodge of bits-and-pieces; it's a mess," says one third-party vendor who asked not to be identified. "The only thing Babylon is adding is an entry-level capability to slice and dice 3270 data streams. The COMTI enhancements will meet only 10-20% of my customers' needs."

While Microsoft officials acknowledge that Babylon will not be the end-all in integration, they disagree with the third-party vendor's conclusions.

"This is a significant upgrade to SNA Server," says Vesa Suomalainen, director of business development for Microsoft's enterprise interoperability group. "We have reused a lot of code, but we have added significant features."

According to Rob Enderle, an analyst with Giga Information Group, "the difference with Babylon is that all the pieces are together and it takes less rocket science to get them together. But this first pass at the product is less than compelling."

Nevertheless, the efforts by Microsoft represent a huge shift in the company's thinking.

"In the past we would say replace legacy systems with NT," says Chris Olson, Microsoft group product manager for enterprise interoperability. "This is the realization that not all data will be on a Microsoft platform."

Microsoft has not gone completely over the edge, however.

Babylon runs only on NT and is tightly integrated with DNA, which still makes for a Windows-centric environment. And the message of integration, as opposed to migration, has a trap door.

"When Microsoft is well-connected to the mainframe it builds a hell of a migration platform," Enderle says. "This is a stealth wolf; you won't see it coming. The mainframe is slowly going away."

Babylon is expected to enter beta testing this fall and ship 90 days after Windows 2000, which is expected to be released before the end of this year. Microsoft has yet to decide if Babylon will ship as a stand-alone package or as a part of packages such as BackOffice and Windows 2000 Advanced Server. ◪

## SNA upgrade

**The next version of SNA Server, code-named Babylon, will add features that allow for richer communication between Windows and mainframe, AS/400 and various Unix platforms. The following is a list of some major features Microsoft plans to publish in the coming weeks.**

| Feature | Function |
|---|---|
| Terminal Oriented Application Support | This COMTI method collects series of 3270 screens into a single object that can be accessed from Visual Basic programs. |
| Host-Initiated Transaction | Allows host-based transaction programs to invoke COM/COM+ components. |
| Replication server | Allows transactional, snapshot and merge data to be replicated from Oracle and DB2 to SQL Server. |
| DRDA services | Allows mainframe and AS/400 environments to access SQL Server data. |
| Software developer's kit | Allows non-IBM mainframe vendors and non-Microsoft-centric application developers to utilize Babylon services. |

**Java,**
continued from page 6

ates what's called a map that shows the relationship between Java classes, such as Customer and Order, and the corresponding tables in a relational database, says Jon Williams, a Sun group marketing manager. JavaBlend then generates the JDBC code that the developer otherwise would have to write. "JavaBlend is really an easier JDBC," he says.

There are a few alternative object-relational mapping tools, among them Secant Technologies' Extreme Persistent Object Service and The Object People's TopLink.

The upcoming production release of JavaBlend will be able to work with much larger databases than the developer's version can, and work with the most recent versions of those databases, according to Sun's Williams. ◪

## Making the Java connection

**An update on Java database tools and standards:**

**JDBC 3.0: A standard call-level API that lets Java applications access relational data.**

- Currently in development by Sun.
- Beta testing to start late summer.
- Will be ready in late 1999, as part of the Java 2 Standard Edition 1.3 specification called "Kestrel."

**JavaBlend: A Sun product that automatically matches Java classes and relational database tables and generates the needed JDBC code.**

- Developer's release available now.
- Deployment release for production applications due later in 1999.
- Support for Java 2 Enterprise Edition.
- Will work with large RDBMSs and the latest versions of them.

**"Java Data Objects" (temporary name): A pending Java standard that describes how to store Java Objects in transactional databases and how to treat these databases as Java objects; will be implemented in JavaBlend and other products.**

- Initial draft now being reviewed as part of the Java Community Process, which develops such standards.
- Release date not yet determined.

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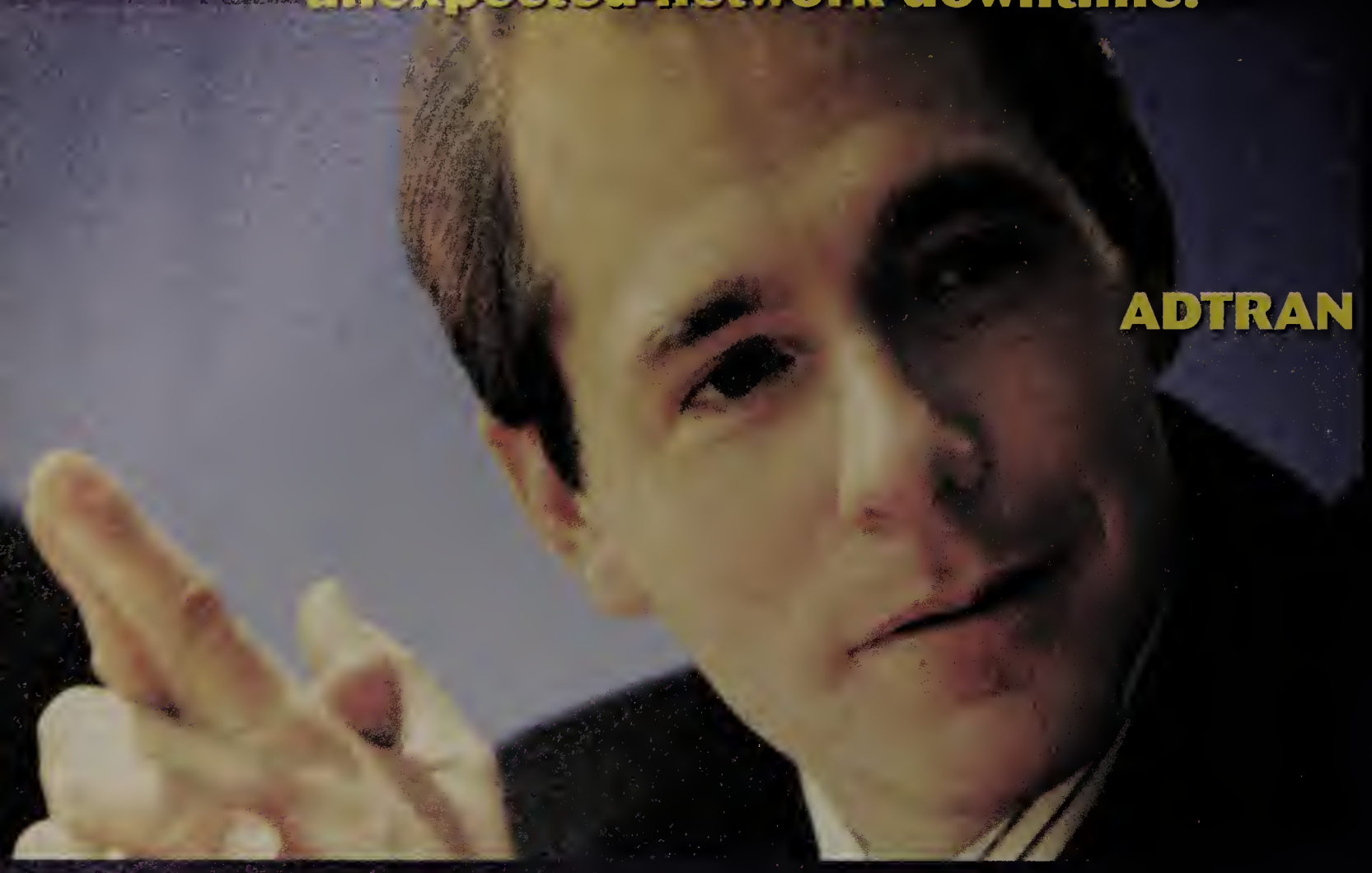

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# Infrastructure

**TCP/IP, LAN/WAN Switches, Routers, Hubs, Access Devices, Clients, Servers, Operating Systems, VPNs, Networked Storage**

## Briefs

Thin-client vendor **Network Computing Devices** will begin offering its ThinPath Plus software for free.

The package is loaded onto PCs and Windows-based terminals that access applications running on multiuser versions of Windows NT.

ThinPath Plus adds audio input and output as well as local parallel and serial port connectivity.

These functions are not yet available on Microsoft's NT Server 4.0 Terminal Server Edition.

The software can be downloaded from www.ncd.com.

**Farallon Communications** has rolled out a Gigabit Ethernet card for use on Windows NT and Mac OS machines.

The PCI-based card features a 1000Base-SX fiber-optic port for 1G bit/sec connectivity.

The card supports the 802.3z Gigabit Ethernet standard and can handle Jumbo Frames, which are extended Ethernet packets designed for easier processing by networked computers.

Also new from Farallon is a compact, eight-port 10/100M bit/sec switch with a shared uplink port. The switch automatically negotiates between 10M bit/sec and 100M bit/sec speeds.

Farallon has also added a new hub to its product line.

The 24-port Fast Starlet Dual-Speed Hub/24 runs at 10/100M bit/sec. It can be rack-mounted and features LEDs for at-a-glance management.

The Gigabit Ethernet card costs $950; the Fast Starlet Palm Switch 10/100 costs $300; and the Fast Starlet Dual-Speed Hub/24 costs $630.

Farallon: www.farallon.com/products

# Brocade unveils Fibre Channel switches

*Second-generation SilkWorm switches offer higher reliability and easy software upgrades.*

BY DENI CONNOR

*SAN JOSE* — Looking to ease access to corporate storage resources, Brocade Communications has revamped its family of storage-area network (SAN) switches.

The company last week introduced three software upgradeable Fibre Channel switches for its SilkWorm line that promise an easy migration path from today's loop-based storage environment to a high-performance, fabric-based SAN.

Storage networks enable high-speed direct access from all servers to all storage devices. The goals of using a SAN are to reduce storage costs and to boost storage utilization.

Fibre Channel loop-based storage lets customers link multiple devices in a point-to-point configuration, providing shared access to gigabit bandwidth.

With loop-based storage, however, only two devices can communicate at any one time, and if one device were to fail, the loop would be out of commission. With a fabric-based SAN, Fibre Channel switches are interconnected over a variety of paths, letting multiple devices communicate simultaneously and providing redundancy in the event of a failure.

Brocade's switches are aimed at small and large enterprise network customers.

The first of the three new switches, the SilkWorm 2100, is an eight-port entry-level switch that works as an alternative to a hub to interconnect Fibre Channel loop-based SANs.

The 2100 can be software upgraded from a loop switch to a fabric switch by downloading a file from Brocade and upgrading the operating system. Each 2100 port supports transfer rates of 200M byte/sec in full-duplex mode. Unlike a hub, which shares bandwidth among ports, the SilkWorm 2100 allows full bandwidth data transfers simultaneously on all ports.

For larger users, Brocade also announced a more feature-filled eight-port switch, the SilkWorm 2400, and a 16-port switch, the SilkWorm 2800.

### A switch in time

**Brocade's 2400 switch offers:**

- Eight ports.
- Fibre Channel arbitrated loop or switched fabric.
- Hardware zoning and IP addressing.
- Hot-pluggable redundant power supplies.
- A browser-based configuration utility.
- Software upgradeability.

The switches offer universal ports, which allow them to be used interchangeably in loop or switched-fabric SANs.

All three switches also use hot-pluggable redundant power supplies.

The 2400 and 2800 switches support hardware zoning and IP addressing. Hardware zoning allows the SAN fabric to be partitioned securely into several virtual private SANs to isolate different operating systems, departments or policies.

"Zoning is an issue that is becoming important in the SAN environment. With hardware zoning, you have an absolute lock on security. No one can change the security unless they know how the switch works," says Farid Neema, president of Strategic Research in Santa Barbara, Calif.

Software zoning is not as robust as hardware zoning and can be more easily compromised.

In addition, Brocade enhanced its switch operating system, dubbed Fabric OS 2.0, which handles management and configuration of the switched fabric. Each switch also includes Brocade Web Tools 2.0, a browser-based configuration and management utility. New software called QuickLoop lets SilkWorm 2400 and 2800 switches coexist in the same fabric network.

All these products operate in the same network with previous SilkWorm and SilkWorm Express products.

The SilkWorm 2400 and 2800 switches will be available this month, followed by the Silkworm 2100, which will ship in August. Pricing was not available.

Brocade: www.brocade.com

# Keeping a closer eye on dial-up VPNs

BY DENISE PAPPALARDO

*SUNNYVALE, CALIF.* — Inverse Networks is teaming with Cisco, Indus River Networks and VPNet Technologies to make the monitoring of dial-up virtual private networks (VPN) easier.

Last week, Inverse announced its TunnelVision Initiative, a program that lets vendors bundle Inverse's IP InSight measurement software with their VPN client software, such as Cisco's VPN Client, Indus River's Riverworks Pilot and VPNet's VPNremote Client Software.

By combining IP InSight and VPN client software, users will be able to set up their own VPN measurement system, so they can ensure their ISPs are living up to their service-level guarantees, says Bobbie Murphy, vice president of marketing at Inverse.

IP InSight lets users gather statistics, such as call failure rates, network throughput and latency, for each dial-up user. Cisco, Indus River and VPNet plan to make IP InSight client software available free to their customers by the third quarter. But before you think you're getting a virtually no-cost way to monitor your dial-up VPN, hold on.

In order to actually gather the statistics IP InSight generates, users first have to purchase Inverse's IP InSight server software, pricing for which starts at $49,000 for 1,000 users. Alternatively, a

See **VPNs**, page 18

### Trying to take the mystery out of dial-up VPNs

**Cisco, Indus River and VPNet are bundling Inverse Networks' IP InSight software so customers can more easily monitor the reliability of their VPNs. IP InSight monitors the performance of each dial-up IP connection. The software reports:**

- The number of failed connection attempts.
- The speed of each connection.
- The number of redials.
- The length of each session.
- Dropped connections.

IN-SITE: *Lessons from Leading Users*

# Domino's pizza delivers a hot and wild new network

BY JIM DUFFY

For pizza deliveries, its tagline is "For Hot and Wild, Call Domino's." One could say the same about its network.

Domino's Pizza has installed a switched Layer 3 Gigabit Ethernet network to support existing and future enterprise resource planning (ERP) and multimedia applications and to guarantee quality of service (QoS) for voice-over-IP and other converged traffic.

The network is replacing a Layer 2 switched and shared 100M bit/sec Ethernet backbone, says Matt Maguire, Domino's director of IT.

"Going from Layer 2 to Layer 3 wasn't necessarily for a technical reason," Maguire says. "If we were migrating, we might as well migrate to the latest technology."

The new network is a redundant campus backbone connecting redundant computer rooms and linking regional sites and distribution centers across the country to headquarters in Ann Arbor, Mich., over a frame relay WAN. The network supports PeopleSoft ERP applications for supply chain, human resource and financial operations; electronic commerce applications; intranet and extranet connectivity to franchisees; and Web-based tasks, such as market research.

The campus net is based on two Nortel Networks' Accelar 1200 Layer 3 backbone switches that are 1,800 feet apart and connected via Gigabit Ethernet over fiber. The switches are replacing Nortel's System 5000 and BayStack 28115 Fast Ethernet switches and hubs in the backbone.

The Accelar switches take in multiple 100M bit/sec uplinks from BayStack 350 and 450 switches in wiring closets that connect Nortel System 5000 and Distributed 5000 hubs and switches to the backbone. Hanging off the Accelar switches are 65 Windows NT and NetWare servers housing the ERP and other applications.

Those servers support up to 800 workstations at Domino's headquarters.

Thirty-two remote sites — distribution centers and regional offices — are connected to headquarters over a frame relay network anchored by Nortel Access Node Hub routers. There are between 20 and 50 workstations, servers and other network nodes at each remote site, Maguire says.

Domino's Matt Maguire designed the network for growth.

While Maguire acknowledges some "upswing" in the performance of current applications by upgrading from shared media to switching, Domino's main objective with the new network is to accommodate future growth and save money.

The company expects to shave $20,000 per month off of its WAN costs alone, Maguire says.

"What we're able to do is sustain our continued growth of new applications coming in, whether it's additional supply chain applications, or a treasury system, tax system or imaging system," he says.

The next major addition may be converged voice, data and video applications. Currently, Domino's Nortel Meridian PBX is supporting ISDN Primary Rate and Basic Rate Interface circuits to deliver videoconferencing to remote regional sites.

Domino's plans to add Nortel's CallPilot software to the PBX to integrate e-mail and voice mail, and then plans to evaluate some Nortel voice-over-IP products for further voice/data integration, Maguire says.

Pretty ambitious plans, but Maguire says the company's new campus network can take whatever Domino's can throw at it — from a bandwidth perspective, anyway.

"We're pretty well-positioned to take advantage [of voice over IP] when products become available," Maguire says.

The caveat is in reliability. Data networks have to be as reliable as — if not more reliable than — the current phone network for companies like Domino's to fully embrace voice over IP.

As for QoS, Domino's is currently aggregating LAN bandwidth to guarantee response time for its ERP applications; there's no fancy queuing or traffic shaping going on.

For the WAN, though, where bandwidth is more limited, Domino's has to do some traffic policing. The company is using Packeteer's PacketShaper bandwidth manager to establish and enforce policies for prioritizing traffic and guaranteeing bandwidth across its frame relay network. PacketShapers apply TCP rate-based flow-control policies to both individual traffic flows and classes of flows to provide predictable service-level control for IP traffic.

TCP rate control is a traffic-shaping technique that paces or smoothes the IP flow by detecting a remote user's access speed, factoring in network latency and correlating this data with other traffic flow information. TCP rate control is designed to evenly distribute packet transmissions by controlling TCP acknowledgments to the sender, causing the sender to throttle back and avoiding packet loss when there is insufficient bandwidth.

This is in contrast to packet queuing in routers, which is susceptible to delay, dropped packets and retransmissions, resulting in a drop in network efficiency.

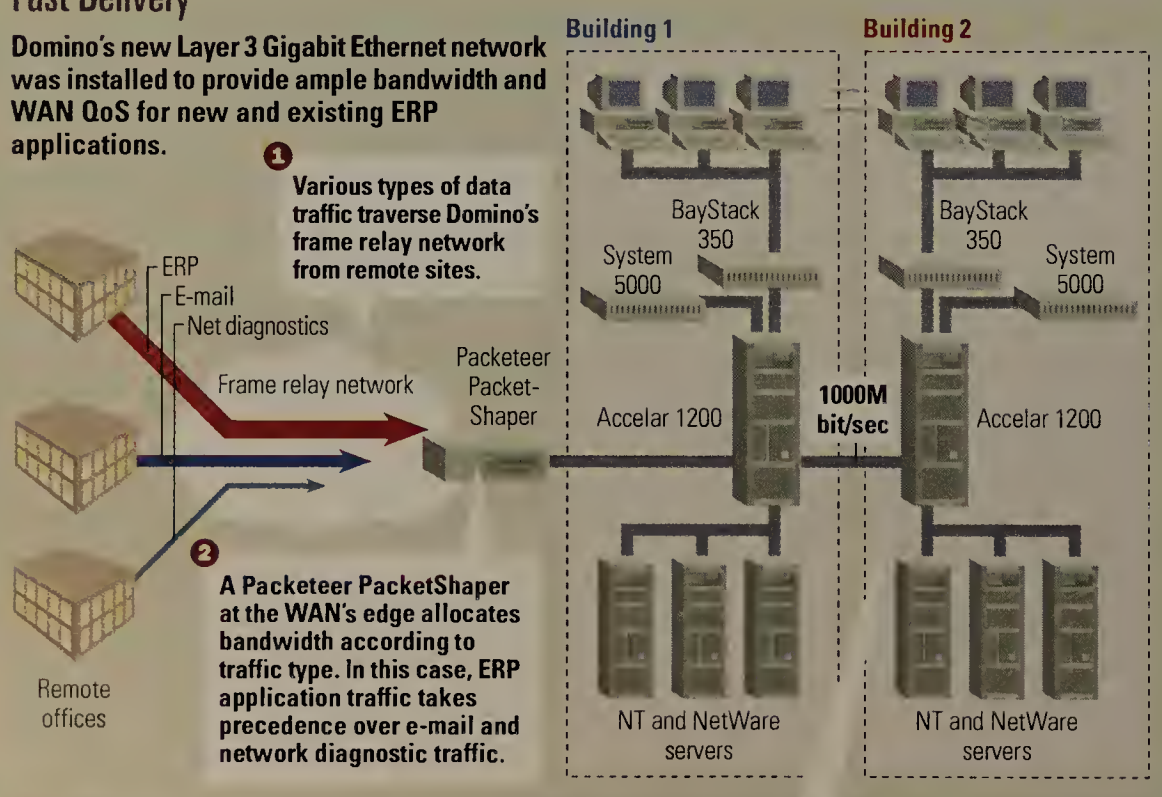
The PacketShapers also save Domino's money in that the company does not have to provision more frame relay permanent virtual circuits to ensure that all applications have access to bandwidth.

As an added dimension to QoS and bandwidth management, Domino's is taking a close look at Nortel's policy-based network initiatives. Nortel recently announced some Optivity management software specifically for defining, distributing and enforcing network service-level policies across its products (*NW*, May 31, page 15).

Network service-level policies will let Domino's make proactive network design decisions based on controlling what's going on within the network as far as allocating bandwidth based on traffic type, Maguire says. ◪

## Fast Delivery

**Domino's new Layer 3 Gigabit Ethernet network was installed to provide ample bandwidth and WAN QoS for new and existing ERP applications.**



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# Psion targets U.S. customers with new handheld device

BY JOHN COX

*CONCORD, MASS.* — The latest computer from handheld pioneer Psion doubles memory and performance and comes equipped with optional software to run Java applications.

The Psion Series 5mx uses an ARM Reduced Instruction Set Computing processor that delivers twice the speed of the previous Psion handheld offering. The device weighs 12.5 ounces and can run for up to a month on two AA batteries.

**Psion's new Series 5mx has double the memory and speed of the company's earlier handheld product.**

The 5mx represents a major effort by the U.K. company to attract users and grab a piece of the U.S. market. Psion has been successful in Europe selling a line of handheld computers, all based on the 32-bit Epoch operating system. The company's U.S. operations are based in Concord, Mass.

Epoch software is developed by Symbian — a joint effort of Psion, Ericsson, Motorola and several other large companies. The software is considered to rival 3Com's Palm operating system and Microsoft's Windows CE.

The 5mx supports 16M bytes vs. 8M bytes in the previous Psion device. For the first time, a 4M-byte Java Virtual Machine (JVM) is included as an installation option on the accompanying compact disk. Today, the JVM lets Psion Series 5mx users view Java applets via the built-in microbrowser. As more Java applications are written for this class of devices, users will be able to download the applications to the handheld computer and run them. The browser now supports frames, along with Post Office Protocol 3 and Simple Mail Transfer Protocol.

Also new is the Internet e-mail package included in the 5mx's read-only memory, which lets the Psion device synchronize with Internet e-mail servers. The product includes a send-receive fax application and Internet Message Access Protocol 4 server support, as well. The 5mx can use any standard desktop modem or an array of PC Card modems. New infrared technology lets users move files to and from devices such as Web phones, which combine a cellular voice handset with an Internet interface.

The handheld connects to desktop PCs for file transfer and data synchronization using the PsiWin connection program. A converter library automatically makes the 5mx compatible with file formats for Lotus SmartSuite, Microsoft Office and other applications. Built-in applications include a word processor, spreadsheet and database.

Available now, the Psion Series 5mx has a list price of $549.

Psion: www.psioninc.com

**VPNs,**
continued from page 15

company could outsource the VPN monitoring to Inverse for $22,700 per year for 1,000 users. Inverse's outsourcing service eliminates the need for a company to purchase and maintain its own IP InSight server. Customers access their VPN information via a secure Web site.

Indus River and VPNet plan to resell IP InSight's server as a package deal. And Indus River plans to integrate Inverse's server software into its RiverWorks Tunnel Server so users won't have to buy the software separately, says Dave Zwicker, vice president of marketing at Indus River.

Inverse's Murphy also says that additional vendors will be part of the TunnelVision Initiative in the near future.

Inverse Networks: www.inversenet.com; Cisco: www.cisco.com; Indus River: www.indusriver.com; VPNet: www.vpnet.com

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• The transcript of a roundtable discussion on VPN issues by some early adopters.
www.nwfusion.com

Wired Windows

Dave Kearns

# SERVER CRASH BACKLASH

My column "Server crash? It's your fault, pal" (*NW,* June 21, page 27) seems to have raised quite a few hackles among those with servers that frequently crash. The prevailing view among those who criticized my stand was that Windows NT is an inherently unstable operating system that even the best network manager can't keep running without frequent crashes.

But roughly half of those who chose to respond talked about how reliable their NT servers are.

Now I'll be the first to tell you that I'd much prefer to run NetWare than NT as my server operating system. However, application requirements (Exchange, SQL Server) sometimes dictate running Windows NT as an application server. If that's the case on your network, then it behooves you to understand the NT operating system as well as the NetWare or Unix system running on your other servers.

Too often, long-time IS shops are ready to trash NT after a brief trial because it doesn't hold up as well as the "other" operating system they've been running. Typical was the note from one person that began:"In the 13 years that I've run Unix servers, they've never crashed. But the NT server we've had less than a year is always crashing."

In my experience, my new Unix servers crashed frequently their first year (I'd had flawless performance from NetWare for many years), but once I took the time to learn the new hardware and software, they also performed without error.

To those of you with much NetWare and Unix experience now faced with an NT server in your mix, don't waste your time moaning about Microsoft. Learn the new operating system, get the right hardware and monitor the server's health just as you would for your older network operating systems.

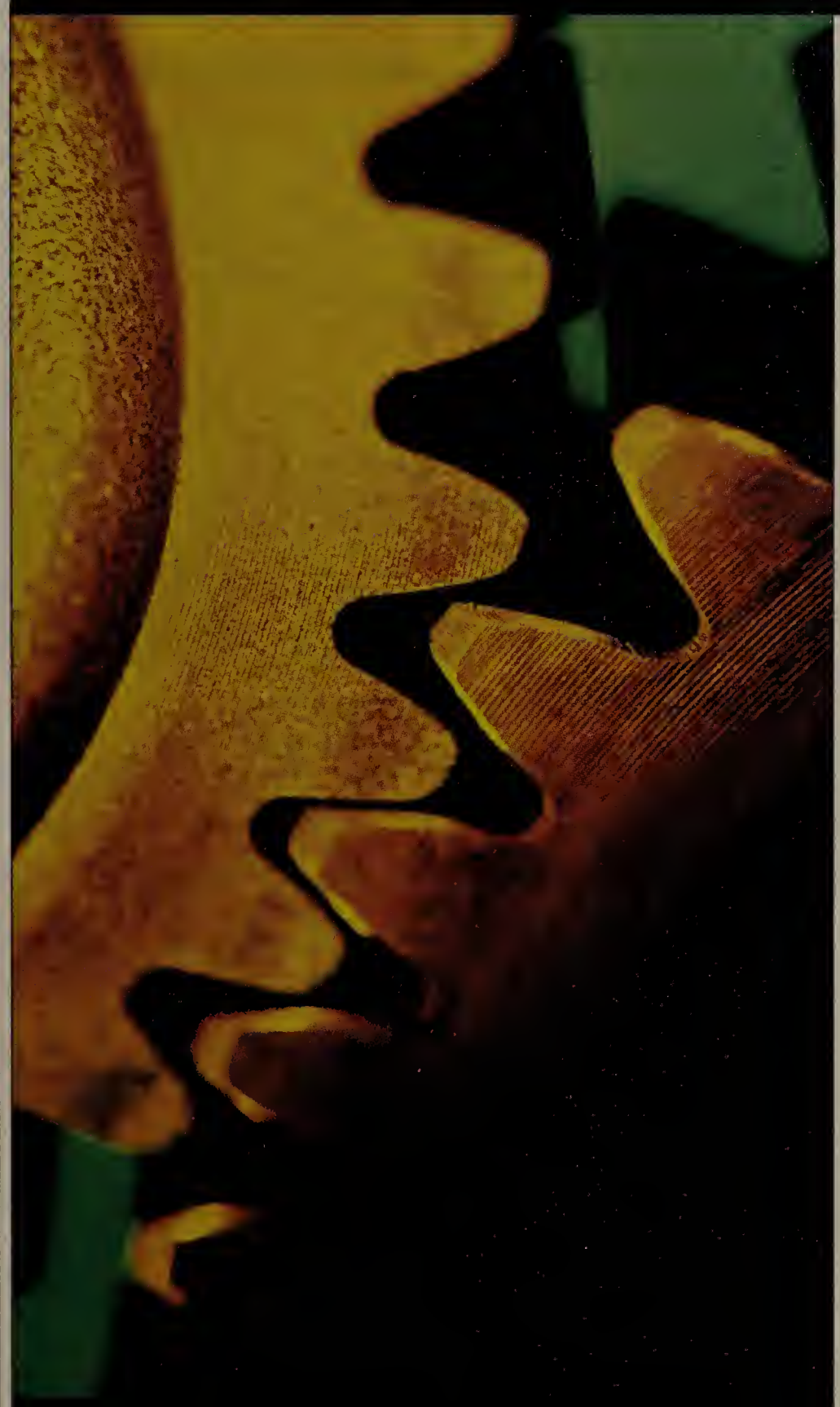
If you've really been trying and your server still crashes frequently — get rid of NT! Find an application that does the job, provides your company with the features it needs and runs on a different operating system. Most SQL Server applications will also run with an Oracle back end. Lotus or GroupWise can replace Exchange. Stop the whining and teeth-gnashing, and get the problem solved.

*Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.*

## Tip of The Week

Metastorm recently won the third round of the Novell Developers' contest for its e-Work product, described as a "work processor." E-Work is, actually, a strategic environment for the development and deployment of Web-based applications, and it is, of course, directory-enabled. It's not a product for every company, but those that use it can experience an increase in productivity. Check out the details at www.metastorm.com/Products.Services/ework.htm


Now you can REALLY integrate Fax with Microsoft Exchange



Your company's Microsoft Exchange server can now do double duty – sending and receiving faxes just as it does email, without doubling your deployment and ongoing management costs. It's the first truly integrated fax solution for Microsoft Exchange. And it's brought to you by two industry leaders: NetMoves (formerly FaxSav), the global leader in Internet Fax, and Fenestrae.

**Don't settle for partial solutions**

Many fax server companies would have you believe they offer an "Integrated Fax Solution" for Microsoft Exchange, when all they've done is connected your user community's Outlook client to their completely unintegrated server. It's hardly an integrated solution if you've got to manage an entirely separate set of hardware, software, analog telecom facilities and administrative tools.

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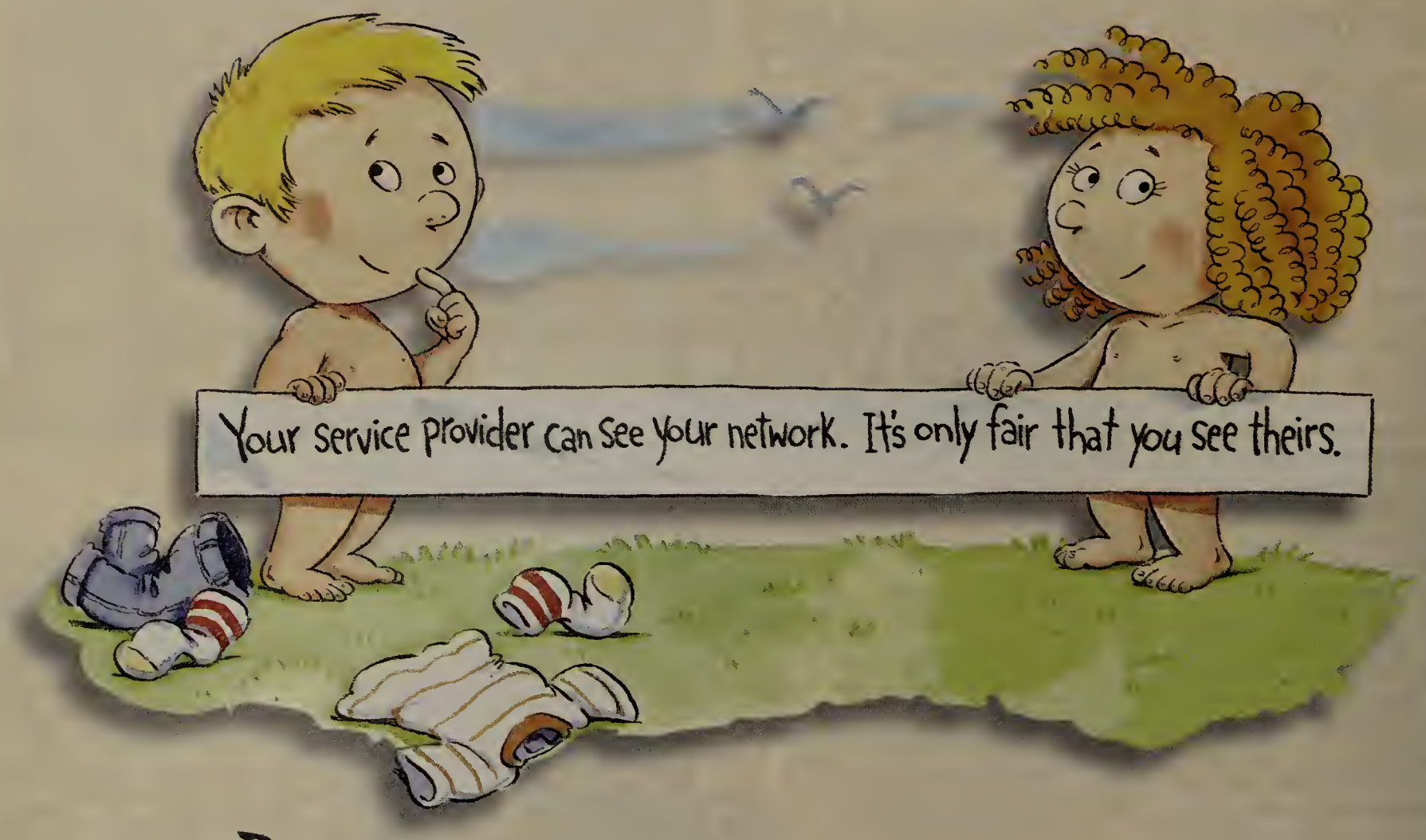


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## Briefs

**VoiceStream Wireless** recently announced plans to acquire **Omnipoint** for $1.7 billion. Omnipoint offers wireless personal communications services (PCS) in New York, Philadelphia, Boston, Miami and Detroit. However, Omnipoint has been having difficulty keeping up with debts incurred while building its infrastructure.

VoiceStream has deeper pockets thanks to investments from other telecom companies. VoiceStream offers wireless PCS service in cities such as Denver, Seattle and Salt Lake City. The service provider has plans to expand into other regions.

VoiceStream: www.voicestream.com; Omnipoint: www.omnipoint.com

**Infonet Services** is touting satellites as a way to circumvent Year 2000 problems that may cripple your land-line WAN connections.

VSAT Connect Y2K Contingency Service Plan gives customers a satellite link between corporate sites to be used if their land lines fail.

Infonet installs a very small aperture terminal antenna at customer sites and connects the terminals to a router that plugs in to the LAN.

A one-year contract for a 256K bit/sec link between two sites costs $120,000.

Infonet: www.infonet.com

The U.S. Department of Justice has approved a joint venture between **British Telecommunications** and **AT&T** to offer global telecom services to multinational companies.

The arrangement had already been blessed by European regulators, and still requires Federal Communications Commission clearance.

# AT&T WorldNet still mending dial-up net

*$60 million investment leaves 21 cities in need of additional upgrade work.*

BY DENISE PAPPALARDO

*BASKING RIDGE, N.J.* — AT&T WorldNet is still trying to keep up with increasing demands on its dial-up Internet access network, despite $60 million worth of upgrades this year.

While AT&T WorldNet claims that most capacity issues on its nationwide dial-up Internet access network have been resolved, point-of-presence (POP) sites in 21 cities remain at full capacity. Tapped-out capacity means poor service for dial-up Internet access customers.

***"There will always be issues across every network about keeping up with demands."***

Michael Chaplo, vice president of marketing, AT&T WorldNet

"That's a significant amount of cities that AT&T still needs to upgrade," says Amanda McCarthy, an analyst at Forrester Research, a Cambridge, Mass., consultancy.

Many ISPs have trouble keeping up with growing user demands on their networks, but it's expected that larger ISPs will do a better job of pushing out modem and infrastructure deployments, she says.

### Working on it

Since March, which marked the peak of trouble on AT&T WorldNet's dial-up network, the ISP has completed POP upgrades in dozens of cities stretching across 24 states (*NW,* March 15, page 1).

The upgrades have included deploying 10,000 modems per month, as well as adding more phone numbers and trunks to handle thousands of new customers.

"There will always be issues across every network about keeping up with demands," says Michael Chaplo, vice president of marketing for AT&T WorldNet. "What we've done is taken care of issues that we've had across the network."

Not in all cases, however. Of the nearly two dozen cities that are still in need of upgrades, four were supposed to see those improvements in March.

Hackensack, N.J., Hayward, Calif., Redwood City, Calif., and Seattle were known to be out of capacity three months ago and are still in the process of being upgraded.

When a POP is out of capacity, dial-up users will experience frequent busy signals, failed connection messages or dropped sessions when they connect. This is especially frustrating to business customers who use AT&T WorldNet's dial-up service to access their corporate virtual private networks, download e-mail or simply search the Internet.

One AT&T WorldNet dial-up customer who complained of service problems in March says things have now gotten better.

"I don't hear the lunch room complaints that I used to," says Scott Rice, vice president of operations at Colorifics, a Westerville, Ohio maker of dance costumes.

However, Rice says AT&T still needs to work on customer service.

"We just received a letter on Monday telling us that on Wednesday we have to start using a new access number," he says. "It would have been nice to get more than a few days warning."

### Where the trouble started

In addition to frustrated business users, AT&T WorldNet also has to deal with consumers who share the same dial-up network. In fact, AT&T WorldNet's heavy push into the consumer market in January contributed to many of the ISP's capacity troubles.

In January, AT&T WorldNet started offering unlimited Internet access for $21.95 per month, an offer that also includes 30M bytes of disk space for a personal Web page and six individual e-mail accounts. AT&T officials view the program as a success and cite 100,000 new customers in the first quarter alone. But AT&T's network was not prepared to handle that many users and buckled under the pressure.

Now AT&T WorldNet has another consumer push underway. Starting this week, the company is lowering its monthly Internet access service rate to $19.90 for customers who are also using AT&T long-distance services, an offer that could set off another surge of new users.

### Ready and waiting

Chaplo insists that most of AT&T WorldNet's 650 POPs are better prepared to handle big bursts in new customer traffic. The ISP has added new modems that bring V.90 56K bit/sec support to the majority of cities in which AT&T WorldNet offers service, he says. The company is working even more closely with AT&T Local Services to stay ahead of the curve by installing new trunks at its POPs in major metropolitan areas.

The trunks are installed and waiting for the day when metropolitan-area POPs approach capacity, he says.

AT&T WorldNet is also beefing up its number of POPs by more than twofold through its acquisition of IBM Global Network, which was finalized last month.

AT&T WorldNet is adding IBM Global Network's 1,400 worldwide POPs to its dial-up infrastructure, Chaplo says. The service provider would not say how many IBM POPs have already been added to AT&T WorldNet's network, but does expect full integration to be complete this year. ◪


More Online

FIND IT 3627 ON FUSION

- More details on the issues faced by AT&T's dial-up network.
- A look at changes in pricing for dial-up networks.

www.nwfusion.com

Wan Monitor . Daniel Briere and Christine Heckart

# QWEST AND US WEST: FAR FROM INSANITY

Has a bout of insanity gripped telecom industry executives in Denver? Is the air too thin there?

Many in the trade and on Wall Street were asking these questions recently when Qwest moved to buy US West.

These naysayers wonder why an emerging service provider, unencumbered — at least in theory — by multiple networks, back-office systems, legacy equipment and services, would want to buy a stodgy, old regional Bell operating company that carries all these burdens?

We have been among the minority buying the argument that US West would drive Qwest's high-speed Internet access plans and, therefore, justify the investment.

As we've said before, the industry is beginning a period of increased specialization sometimes described as "deconstruction." One layer of this specialization is the ownership and operation of the physical network by a handful of global supercarriers. Another layer will be a fragmented multitude of application service providers catering to specific communities of interest.

Like other facilities-based providers, Qwest wants to be left standing when the consolidation dust settles, meaning it has a pressing need for network real estate. Any successful global supercarrier will control an end-to-end wire-line and wireless network spanning local, national and international boundaries.

Why? Low unit cost, scalability and network ubiquity are the attributes of success in this primarily wholesale business model.

In this age of eat or be eaten, Qwest looks to be a yummy morsel for many a telecom shark. So Qwest will use its high market capitalization to go on a buying spree with company stock as tender. Whether or not the US West deal goes through, expect others like it to follow.

But will the deal pan out? We think probably not, and that's too bad for US West stockholders. The competing Global Crossing deal wouldn't give US West stockholders the same bang for their buck because the "old" processes and management philosophy will persist in a post-merger environment. US West/Global Crossing wouldn't be any more aggressive in launching services, so stockholders wouldn't get the high valuation on predicted future earnings.

It's hard to say that consolidation is always good. After all, the mess in which many MCI WorldCom Cable & Wireless data customers find themselves as a result of that deal is not something you would wish on an enemy.

Such consolidation means mostly short-term pain for end users, as processes, billing, sales forces and networks are consolidated. Long-term you can hope to get lower prices and easier global networks to build and manage.

To offset that short-term pain, you might try investing in a stock market that seems to cure all ills. Otherwise, buy your aspirin in bulk. There are more of these deals on the way.

*Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.*


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| ☐ | ☐ | 1. Network Management | ☐ | ☐ | 5. Internet/Intranet/E-Commerce Mgmt, Webmaster | ☐ | ☐ | 7. Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.) |
| ☐ | ☐ | 2. LAN Management | ☐ | ☐ | 6. Engineering Management | ☐ | ☐ | 8. Consultant (Independent) |
| ☐ | ☐ | 3. Datacom/Telecom Management | | | | ☐ | ☐ | 9. Other (please specify) |
| ☐ | ☐ | 4. IS/IT/MIS/CIO/CTO/Systems Management | | | | | | |

## 3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–N.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainframes/Minis)*
B ____ Desktops *(Micros/Laptops/ Workstations/PDAs)*
C ____ Servers
D ____ LANs
E ____ WAN Equipment
F ____ Carrier Services
G ____ Internetworking
H ____ Internet
I ____ Intranet
J ____ Extranet/Ecommerce
K ____ Remote Access
L ____ Peripherals (including storage)
M ____ Software
N ____ Service/Support

## 4. What is the total number of sites for which you have purchase influence? (check ONE only)

1. ☐ 100+ 2. ☐ 50 – 99 3. ☐ 20 – 49 4. ☐ 10 – 19 5. ☐ 2 – 9 6. ☐ 1 7. ☐ None

## 5. What is the total number of Servers/Clients/LANs installed/planned at your location/ in your entire organization? (check ONE box in each column)

| SERVERS | | | CLIENTS | | | LANS | | |
|---|---|---|---|---|---|---|---|---|
| At Location | | Entire Org. | At Location | | Entire Org. | At Location | | Entire Org. |
| A | | B | C | | D | E | | F |
| ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ | ☐ | 1. 50,000+ | ☐ |
| ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ | ☐ | 2. 10,000 to 49,999 | ☐ |
| ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ | ☐ | 3. 1,000 to 9,999 | ☐ |
| ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ | ☐ | 4. 100 to 999 | ☐ |
| ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ | ☐ | 5. 50 to 99 | ☐ |
| ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ | ☐ | 6. 10 to 49 | ☐ |
| ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ | ☐ | 7. 1 to 9 | ☐ |
| ☐ | 8. none | ☐ | ☐ | 8. none | ☐ | ☐ | 8. none | ☐ |

## 6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

**A. Scope** (check ONE only)

CORPORATE:
1. ☐ Entire Enterprise/Multiple Enterprises
2. ☐ Division/Multiple Divisions
3. ☐ Department
4. ☐ None

**B. Involvement** (check ALL that apply)
1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

## 7. What is the estimated number of employees at your location/in entire organization? (check ONE in each section)

**A. At your location:**
1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

**B. Entire organization:**
1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

## 8. Please indicate the Internet/Intranet/LAN/WAN products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

A. Currently involved In purchasing B. Plan to purchase

**INTERNET/INTRANET**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 1. VPN Equipment | ☐ | ☐ | 7. Voice/Video over IP (IP Multicast Routing) | ☐ | ☐ | 12. Management/Monitoring Software |
| ☐ | ☐ | 2. VPN Services | ☐ | ☐ | 8. Internet Services | ☐ | ☐ | 13. Web Based Management Tools |
| ☐ | ☐ | 3. Firewalls/Security/Encryption | ☐ | ☐ | 9. Web Hosting | ☐ | ☐ | 14. Web Based Collaboration/ Groupware |
| ☐ | ☐ | 4. Electronic Commerce | ☐ | ☐ | 10. Host Access | ☐ | ☐ | 15. Caching/Load Balancing Products |
| ☐ | ☐ | 5. Web Servers/Software | ☐ | ☐ | 11. Web Development Tools | ☐ | ☐ | 16. Other Internet/Intranet |
| ☐ | ☐ | 6. Web Enabled Call Center Tools | | | | | | |

**LOCAL-AREA NETWORKS/INTERNETWORKING**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 17. Local-Area Networks | ☐ | ☐ | 25. Layer 2 Switches | ☐ | ☐ | 33. UPS |
| ☐ | ☐ | 18. Network Operating System Software (NOS) | ☐ | ☐ | 26. Layer 3 Switches | ☐ | ☐ | 34. Network Interface Cards (NICs,PCMCIA) |
| | | | ☐ | ☐ | 27. Layer 4 Switches | | | |
| ☐ | ☐ | 19. Intel Based Servers | ☐ | ☐ | 28. ATM Switches | ☐ | ☐ | 35. Hubs/Intelligent Hubs/Stackable Hubs |
| ☐ | ☐ | 20. Intel Based Multiprocessor Servers | ☐ | ☐ | 29. Token-Ring Switches | | | |
| ☐ | ☐ | 21. RISC Based Servers | ☐ | ☐ | 30. Network Storage (NAS, SANs) | ☐ | ☐ | 36. Cables,Connectors,Baluns |
| ☐ | ☐ | 22. Clustered Servers | ☐ | ☐ | 31. Storage/Backup (Optical, Disk, Tape, RAID) | ☐ | ☐ | 37. SNMP Platform |
| ☐ | ☐ | 23. Print Servers | | | | ☐ | ☐ | 38. Management Frameworks |
| ☐ | ☐ | 24. Routers | ☐ | ☐ | 32. Network Test/Diagnostic Tools | ☐ | ☐ | 39. Other LAN/Internetworking |

**WAN EQUIPMENT & SERVICES**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 40. Modems | ☐ | ☐ | 46. Remote Access Services | ☐ | ☐ | 53. PBXs |
| ☐ | ☐ | 41. Cable Modems | ☐ | ☐ | 47. Wireless Data Equipment/Services | ☐ | ☐ | 54. Videoconferencing |
| ☐ | ☐ | 42. Asynchronous Transfer Mode (ATM) | ☐ | ☐ | 48. ISDN Equipment/Services | ☐ | ☐ | 55. Managed LAN/Router Services |
| ☐ | ☐ | 43. Frame Relay Equipment including FRADS | ☐ | ☐ | 49. FT-1/T-1/T-3 Services | ☐ | ☐ | 56. Fax Servers/Services |
| | | | ☐ | ☐ | 50. xDSL Services/Products | ☐ | ☐ | 57. Other WAN Equipment/Services |
| ☐ | ☐ | 44. Frame Relay Services | ☐ | ☐ | 51. Diagnostic/Test Equipment | | | |
| ☐ | ☐ | 45. Remote Access Products | ☐ | ☐ | 52. DSU/CSU | | | A B |
| | | | | | | None of the above (1 - 57) | | ☐ ☐ 58. |

## 9. Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

**COMPUTERS/PERIPHERALS**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 1. Laptops/Notebooks/PDAs | ☐ | ☐ | 5. Storage/Backup (Optical,Disk,Tape,RAID) | ☐ | ☐ | 8. Minis |
| ☐ | ☐ | 2. PCs | | | | ☐ | ☐ | 9. Mainframes |
| ☐ | ☐ | 3. Windows Terminals/Thin Clients | ☐ | ☐ | 6. Printers | ☐ | ☐ | 10. Fax/Modem Boards |
| ☐ | ☐ | 4. Workstations | ☐ | ☐ | 7. Printer/Fax/Copier Hybrids (Multifunction Printers) | ☐ | ☐ | 11. Memory/Chips/Boards/Cards |
| | | | | | | ☐ | ☐ | 12. Other Computers/Peripherals |

**SOFTWARE/APPLICATIONS**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 13. Network Management | ☐ | ☐ | 21. E-Mail | ☐ | ☐ | 28. Site Metering Tools |
| ☐ | ☐ | 14. Systems Management | ☐ | ☐ | 22. Enterprise Resource Planning (ERP) | ☐ | ☐ | 29. Data Warehousing |
| ☐ | ☐ | 15. Security | | | | ☐ | ☐ | 30. Anti Virus Software |
| ☐ | ☐ | 16. Directory Services | ☐ | ☐ | 23. EDI | ☐ | ☐ | 31. Multimedia |
| ☐ | ☐ | 17. Operating Systems | ☐ | ☐ | 24. Desktop Videoconferencing | ☐ | ☐ | 32. Y2K Conversion Software |
| ☐ | ☐ | 18. Applications Development Tools | ☐ | ☐ | 25. Imaging | ☐ | ☐ | 33. Helpdesk |
| ☐ | ☐ | 19. Database Management/RDBMS | ☐ | ☐ | 26. Middleware/Serverware | ☐ | ☐ | 34. Other Software/Applications |
| ☐ | ☐ | 20. Groupware | ☐ | ☐ | 27. Document Management | | | |

**SERVICES**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 35. BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics etc.) | ☐ | ☐ | 36. Applications Outsourcing | ☐ | ☐ | 39. Education/Training Services |
| | | | ☐ | ☐ | 37. Call Center Outsourcing | ☐ | ☐ | 40. Other Services |
| | | | ☐ | ☐ | 38. Systems Integration/Consulting | | | A B |
| | | | | | | None of the above (1 - 40) | | ☐ ☐ 41. |

## 10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed B. Planned for purchase

**NETWORK PROTOCOLS**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 01. TCP/IP | ☐ | ☐ | 04. Novell IPX/SPX | ☐ | ☐ | 07. NFS |
| ☐ | ☐ | 02. IPv6 | ☐ | ☐ | 05. APPC/APPN/LU 6.2 | ☐ | ☐ | 08. SNMP |
| ☐ | ☐ | 03. SNA | ☐ | ☐ | 06. NETBIOS/NETBUEI | ☐ | ☐ | 09. Other Network Protocols |

**LAN/WAN ENVIRONMENT**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 10. Gigabit Ethernet | ☐ | ☐ | 16. IP Switching | ☐ | ☐ | 22. Wireless |
| ☐ | ☐ | 11. Switched Ethernet | ☐ | ☐ | 17. Layer 3,4 Switching | ☐ | ☐ | 23. DSL |
| ☐ | ☐ | 12. Fast Ethernet | ☐ | ☐ | 18. FDDI | ☐ | ☐ | 24. ISDN |
| ☐ | ☐ | 13. Ethernet | ☐ | ☐ | 19. 100Base-T | ☐ | ☐ | 25. Frame Relay |
| ☐ | ☐ | 14. ATM | ☐ | ☐ | 20. 10Base-T | ☐ | ☐ | 26. Private Line T1, T3, FT-1, SONET |
| ☐ | ☐ | 15. Token Ring/Token Ring Switching | ☐ | ☐ | 21. Fibre Channel | ☐ | ☐ | 27. Other LAN/WAN Environment |

**NETWORK OPERATING SYSTEM**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 28. Windows NT/Windows 2000 | ☐ | ☐ | 32. LINUX | ☐ | ☐ | 35. IBM (LAN Server) |
| ☐ | ☐ | 29. Novell (NetWare 5.X) | ☐ | ☐ | 33. Microsoft (LAN Manager) | ☐ | ☐ | 36. Other Network Operating System |
| ☐ | ☐ | 30. Novell (NetWare 4.X) | ☐ | ☐ | 34. Banyan (Vines) | | | |
| ☐ | ☐ | 31. Novell (NetWare 2.X,3.X) | | | | | | |

**COMPUTER OPERATING SYSTEM**

| A | B | | A | B | | A | B | |
|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | 37. NT Workstation | ☐ | ☐ | 42. LINUX | ☐ | ☐ | 47. Digital VMS |
| ☐ | ☐ | 38. Windows 2000 | ☐ | ☐ | 43. DOS | ☐ | ☐ | 48. Macintosh |
| ☐ | ☐ | 39. Windows 98/95/3.1 | ☐ | ☐ | 44. OS/2,OS/2 WARP | ☐ | ☐ | 49. Other Computer Operating System |
| ☐ | ☐ | 40. Intel based UNIX | ☐ | ☐ | 45. OS/400 | | | A B |
| ☐ | ☐ | 41. RISC based UNIX (incl. SOLARIS) | ☐ | ☐ | 46. IBM MVS/VM/VSE/ESA | None of the above (1- 49) | | ☐ ☐ 50. |

## 11. Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

**A - Mainframes (Large Scale)**
1. ☐ IBM
2. ☐ Other

**B - Minis (Midrange)**
1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital/Tandem/Compaq
4. ☐ Unisys
5. ☐ H-P
6. ☐ Other

**C - Workstations**
1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Digital/Compaq
4. ☐ IBM
5. ☐ Silicon Graphics
6. ☐ Other

## 12. What is the estimated gross revenue of your entire company/institution? (check ONE only)

1. ☐ $100 Million or More
2. ☐ $50 Million to $99.9 Million
3. ☐ $25 Million to $49.9 Million
4. ☐ $20 Million to $24.9 Million
5. ☐ $10 Million to $19.9 Million
6. ☐ $5 Million to $9.9 Million
7. ☐ $1 Million to $4.9 Million
8. ☐ $500,000 to $999,999
9. ☐ $250,000 to $499,999
10. ☐ $100,000 to $249,999
11. ☐ None of the above

## 13. For which areas outside of the US do you have purchase influence? (check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
7. ☐ Africa
8. ☐ Canada
9. ☐ None

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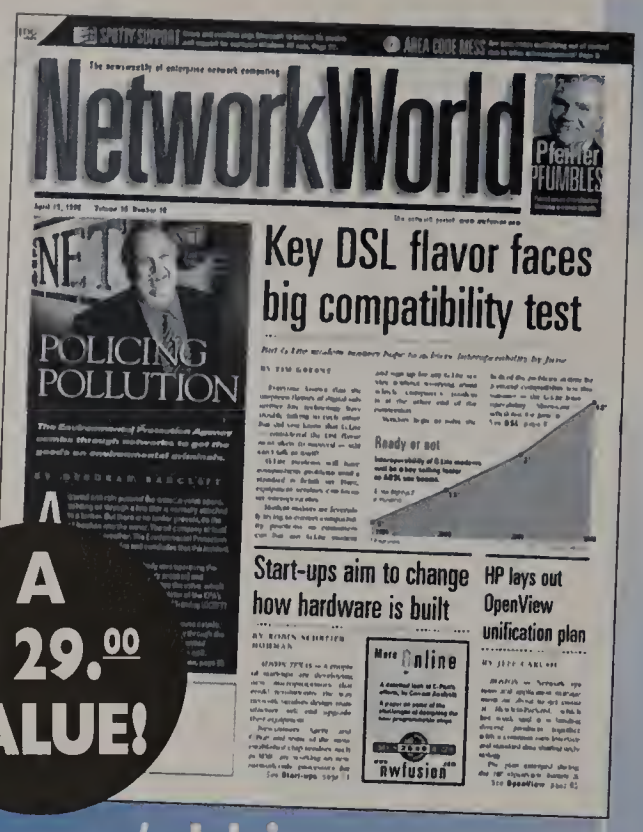


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# Enterprise Applications

*Intranets, Messaging/Groupware, E-commerce, Security, Network Management, Directories*

## Briefs

**Microsoft** last week released Version 3.0 of its NetMeeting desktop conferencing software. The application features an IP telephony gateway, H.323 Version 2.0 gateway and enhanced data conferencing security capabilities that let users access an unmanned remote desktop. An ActiveX control and scripting interface let developers embed NetMeeting in Web-based electronic commerce or customer service applications. The free software is available for download at www.microsoft.com/windows/ netmeeting/.

**Allegis** has shipped Allegis Sales Partner 1.0. This software maintains sophisticated profiles of trading partners; automates the delivery of critical information, such as sales reports; lets teams from different companies work together and monitor performance; and tracks funds. Allegis Sales Partner 1.0 costs $250,000.

Allegis: www.allegis.com

Amazon.com may not exactly be shaking in its increasingly well-heeled boots, but there is growing competition. Bookseller **Fatbrain.com,** for instance, claims the company is growing like crazy, and has moved to Santa Clara, Calif., where the firm enjoys larger digs. The firm also boosted its inventory with tens of thousands of new titles.

Rep. Ray LaHood (R-Ill.) has introduced a bill called the **Freedom to E-File Act** (H.R. 852). The bill would require the U.S. Department of Agriculture to establish an electronic filing and retrieval system so farmers could communicate with the USDA over the Internet. In addition, the bill would have the USDA post farm program information and quarterly trade reports online.

# Axent to find, patch holes in your net

BY ROBIN SCHREIER HOHMAN

Drew Williams says you would be surprised at the number of managers who leave their networks open to attack by simple, careless — and dare we say stupid — mistakes.

As a founder of the Information Security Swat Team at Axent Technologies, Williams' job is to show companies just where their vulnerabilities lie. Once the security problems are found, Axent's new strategy is to show companies how to patch up the holes.

The plan is designed to actively protect the security of networks, with a particular focus on e-business.

### Security at your door

The company will assess vulnerabilities in a network; provide security to detect intrusion; support secure Internet communications between network and mobile employees; and manage and administer users and resources.

The Information Security Swat Team is a key part of the overall strategy; it is the group that sees firsthand the trouble companies get themselves into.

Williams tells the story of a government Web site that recently got hacked because a network manager left some default Unix services intact on the site's server.The hackers knew how to exploit the services to shut down the systems, Williams says. Then, while the network administrator dealt with what he thought was a denial-of-service attack, the hacker merrily roamed through the downed network gathering up sensitive user and password information.

"The intent was to bring the system down so the hacker could write code, get in and get user privileges," he says.

Axent says companies should decide how valuable their assets are, where they're located and who wants to get to them. Then firms should base security policies on that level of importance.

Obviously, a financial institution has to worry about hackers stealing money. Other businesses may only have intellectual property to protect, but that doesn't mean they're safe. Williams points out that most hacking is based on curiosity and practical jokes, and 85% of hacking comes from inside an organization.

That leads to an interesting dichotomy: the more noise you make about having a secure network, the more interested people become in breaking in.

### Here to help

Axent proposes to protect corporate networks with its new Smart Security Architecture. The idea is to look at a network's policies, standards, procedures and metrics before deciding on levels of security.

After Axent assesses the risk level, the firm's consultants will design a security roadmap that will detail what products are needed to contain the risk. As the products are deployed, Axent's service consultants will train network staff on what they're doing, why they're doing it, and how they can monitor and manage the products. Finally, Axent works with the staff to create monitoring procedures and recovery plans. ◩

### Axent's e-comm security plan

**Axent's new Smart Security Architecture focuses on managing the risks inherent in Webifying a company's network for electronic commerce or business-to-business transactions.**

**The new strategy includes:**

- A policy engine that centrally manages and monitors all components needed for security.
- Security products that protect all assets across the network.
- Entrust-enabled products that use PKI and security agents for authentication and monitoring.
- Intrusion-detection products that interoperate with firewalls.
- Centralized, real-time security monitoring throughout the network.

# Novell to unite directory with policy mgmt.

BY JEFF CARUSO

Novell promises to roll the policy-based management technology that it recently acquired from Ukiah Software into a directory product by year-end.

The combination of policy-based management software and directory services makes sense, given that the management software needs access to directories of the users and network resources for which policies are set.

Novell will honor Ukiah's existing support contracts, but it has no plans to continue to sell or further develop Ukiah's products, a Novell spokesman says. The technology, which includes traffic monitoring and bandwidth shaping, will instead be incorporated into the new directory-enabled product.

"It's a little disheartening" to see the existing software abandoned, says Teo King, systems manager of Web Professionals, a Web-hosting service provider and current user of Ukiah products.

King says he will consider using the directory-enabled product in the future, although he doesn't currently use Novell's NetWare operating system.

Policy-based management is a concept in which network and systems managers determine which users can access network resources.The amount of bandwidth allocated to a particular user or application would be a common policy.

Many network hardware vendors have developed policy management software, but it is usually limited to their own hardware. Ukiah, in Campbell, Calif., is one of a few start-ups creating software that can set policies for multiple vendors' hardware.

"I think it's an absolutely brilliant fit," says Sam Alunni, president of enterprise infrastructure at Sterling Research in Sterling, Mass. He points out that this acquisition is one way of Novell applying its Novell Directory Services (NDS) as a central repository of network knowledge.

Novell says it has no plans to make the Ukiah technology directly communicate with Microsoft's Active Directory. However, NDS will eventually have ties to the competing directory.

*Network World* named Ukiah one of the 10 companies to watch in 1999 (*NW*, April 26, page 73).

Financial terms of the acquisition were not disclosed. ◪

# Tally offers Windows 2000 migration scorecard

*New asset management features in NetCensus software targeted at Windows 2000 upgrade.*

BY JOHN FONTANA

Like skilled mountain climbers preparing for a tough ascent, network managers had better gather their gear for the hike up to Windows 2000.

With all the hardware and software requirements the new operating system will bring, advanced planning can't be overdone. Those who don't give due diligence to preparation may find their network operating system upgrade doubly difficult.

Third-party vendors are already busy trying to prepare users for the trek to Active Directory, the toughest of the Windows 2000 peaks. But other considerations do exist, most notably the need to take a simple inventory of the hardware and software that sits on a network. Windows 2000 will not only tax hardware, especially memory reserves, but also aging software versions.

### Taking stock

With that in mind, Tally Systems last week introduced Version 2.95 of its NetCensus asset management tool. Tally is pitching the software as a way to collect important data for planning Windows 2000 migrations.

Tally has added a host of new CPUs that NetCensus can identify and has increased its recognition portfolio to more than 10,000 software titles.

With the Data Center version of Windows 2000 Server requiring specific hardware, network managers can get a sense if they have what it takes to run the platform. Also, Windows 2000 Professional, the desktop version of the operating system, will require machines with a minimum of 64K bytes of RAM.

"I'll run searches for machines with less than 128K of RAM so I can get a list of the machines I need to upgrade," says Kris Kaull, IT administrator at Dynojet Research in Belgrade, Mont. "I'll also use NetCensus to search for the other pieces of the network that won't work with Windows 2000."

Tally has added support for a laundry list of new CPUs that the system can inventory, including Intel Pentium II and III, and Xeon and Celeron processors. The software also recognizes AMD, Cyrix, WinChip and NexGen processors.

Support for Dell systems has been boosted to include reports on system model, serial number and asset tags.

A third new feature offers data collection on Windows Service Pack versions from all machines running Windows 95 and 98.

"Users need to get a handle on software and hardware dependencies for Windows 2000," says Karen Horvath, NetCensus product manager. "We show what PCs need to be replaced and what upgrades must be made."

Tally Systems is not alone in providing this capability to corporate users. Intel's LANDesk and Veritas' Desktop Management Suite also provide inventory features.

NetCensus is available now and is priced between $10 and $15 per node, depending on number of nodes.

Tally Systems: www.tallysystems.com

# Web-based service creates cross-company groupware

BY JOHN COX

New Java software from start-up X-Collaboration lets users from different companies work together on group projects, such as contracts, bids or marketing programs.

X-Collaboration.com creates a secure, ready-to-use application at X-Collaboration's site. The application then can be accessed with a Web browser by anyone who's part of a project team. Traditional groupware products let users in the same company create and share documents for projects of this type.

Instead of having to buy, connect and run a set of products, users can simply pay a yearly per-user fee to access an ISP. Business partners, suppliers, customers and other outside parties in groupware projects can tie in to that service.

X-Collaboration.com software runs on servers maintained by Exodus Communications, an Internet and application-hosting service. Customers log on to an X-Collaboration server via the Web and download a client program. From there, users are presented with an "intelligent white board," which offers them an array of information such as HTML documents, files from desktop applications such as Excel spreadsheets and URLs. These can be edited and resaved on the X-Collaboration servers, says Kevin Lo, chairman and CEO of X-Collaboration.

X-Collaboration software keeps a database of metadata — information about when data is created, who it was created by and when and how data was changed. Another database stores an audit trail of all changes.

Investor David Solomont, of Boston, is handing out access to X-Collaboration.com to members of CommonAngels (www.commonangels.com), a group of individual investors who focus on New England Internet start-up companies. The companies complete an X-Collaboration online form, and this information, along with comments from investors, is stored on X-Collaboration servers, where it can be tracked and updated.

Each application can be treated as a separate project. If the application is approved, the company's officers then have access to X-Collaboration to file updates, progress reports and other information needed by the investors to track performance.

"As a Web-hosted service, it's very convenient for cross-company communications and work," Solomont says. "I've been able to set it up pretty much single-handedly."

In June, X-Collaboration announced that the Web access will support Secure Sockets Layer for increased security and full compatibility with Microsoft Office 2000's XML support.

Office 2000 applications will generate XML documents that can be stored directly in the XML database servers used by X-Collaboration.com.

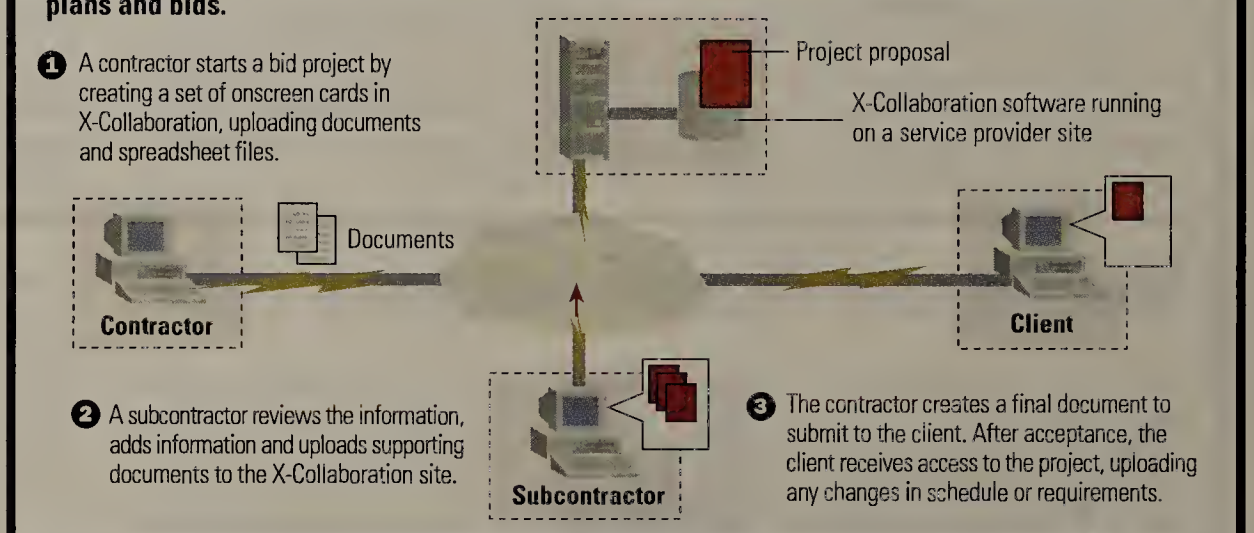
Customers can use X-Collaboration's Oracle database servers or place their own at the Exodus data center. The service, available now, costs $100 per user, per year. The initial five-user contract, for $550, includes 50M bytes of disk storage space and a one-time database setup fee of $50.

Additional user licenses are $95 per year. Additional storage is $550 for 50M bytes; $2,550 for 250M bytes; and $10,500 for 1G byte.

X-Collaboration: www.x-collaboration.com

## Multiuser groupware as a Web service

**Users from different companies can log on, via a Web connection, to a shared groupware server. There, they can securely work together on projects, such as requests for proposal, marketing plans and bids.**



'Net Insider

Scott Bradner

# RESISTANCE IS FUTILE

It is not a question of if you will pay taxes on the things you purchase over the Internet, it's only a question of when.

Congress last year passed the Internet Tax Freedom Act, which provided a moratorium on the imposition of new taxes that single out electronic commerce or Internet access. The act

actually has a misleading title because it set up a commission to make recommendations to Congress on how to tax Internet-based commerce. While the act sounds neutral about imposing taxes on Internet sales, the reality of sharply increasing sales over the Internet is that taxes will follow.

The tax problem (a problem from the point of view of the 30,000 or so taxation authorities in the U.S.) is not a new one. About $4 billion in tax revenue is "lost" each year through the ground rules that the Supreme Court has imposed on mail-order sales. "Lost" to taxation authorities means "found" by consumers. At only about $170 million, Internet-related tax losses are currently inconsequential. But these losses are expected to grow dramatically over the next few years.

The U.S. Department of Commerce projects a loss of $17 billion annually by 2002, and a survey prepared by local government leaders projects a loss of $1.25 trillion by 2003. I guess the local leaders are even more bullish on the 'Net than us geeks.

Mail-order and Internet-based sales present some of the same complexities to those who would tax us. I'm sitting in my house in Cambridge, Mass., and I place an order with L.L. Bean, which officially is located in Maine, but uses a phone bank or Web server located in Oklahoma. I pay with a credit card from a company that has its corporate headquarters in New York and uses a data processing center in Connecticut. Meanwhile, the product is shipped from a warehouse in Georgia. Just who should get what revenue if a transaction such as this is taxed?

The problem is not made any easier by the international nature of the Internet. Trying to reconcile different types of taxes across national borders adds to the fun.

The commission defined by the Internet Tax Freedom Act met a few weeks ago, and it was clear from the opening remarks that commission members expect to determine a way to tax the 'Net. The clearest results of the first meeting were that any taxes had to be easy for the consumer and taxing authorities to understand and that any taxes must not discriminate against 'Net-based sales. While it's not in the commission's mandate, I would not be all that surprised to see the group include taxes on mail-order sales in its recommendations.

This is a very difficult problem, but I fully believe in the ingenuity of the government when it comes to imposing taxes. We will be paying these taxes soon.

Disclaimer: Harvard revels in tackling hard problems with ingenuity, but the above is my prediction.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.*

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# NDS partners are rock solid

BY ROBIN SCHREIER HOHMAN

**DIRECTORY SERVICES**

***Novell and its third parties will offer policy-based applications by year-end.***

You could have the best product in the world, but without any backers, it's pretty much useless.

That's why Novell has been so busy picking up partners to support Novell Directory Services (NDS). Fortunately, the company's partnerships with key network vendors are on track, meaning network executives should be able to implement NDS-enabled policy-based applications by year-end.

So far, Novell has signed with Lucent, Nortel Networks, Cabletron, IBM, Oblix and a host of other smaller companies. While some of the vendors, such as Lucent, have agreed to license NDS — which means the company will ship a version of the directory with its NDS-enabled switches — other companies are simply modifying their devices to work with the directory.

The big holdout has been Cisco, which has had an exclusive agreement to license Microsoft's Active Directory Services for more than two years. Even though ADS isn't expected to ship until the fall, Cisco has said it will still not license NDS. However, Cisco is working on switches, routers and other products that will integrate with NDS, according to Jim Turner, senior manager for network management partnerships and standards at Cisco. Roughly translated, that means he's the guy who's managing Cisco's directory-enabled networking for enterprise customers.

Turner and some industry analysts claim that actually licensing NDS isn't necessary for Cisco to support the directory.

"I would like to see Cisco network services for NDS as well as Cisco network services for Active Directory," says Jamie Lewis, president of The Burton Group. He says he doesn't care how Cisco actually does it. "If they license it, fine. If they don't license it and just write to it, fine," he says.

Without a doubt, Cisco's failure to spell out its position on NDS until recently has left the door wide open for competitors to grab the spotlight.

### Lucent eyes integration

Lucent was the first big network vendor to sign on for NDS. The company is taking a more far-reaching approach with Novell, actually licensing NDS so that Lucent can get down into the deepest layer of code for optimal integration.

"The general thrust is to incorporate directory capabilities into a number of our products," says Paul Parker-Johnson, product line manager at Lucent's LAN Systems Group for policy-based networking and network management.

So far, Lucent has agreed to integrate NDS with several products. The first, which is going into beta now and will ship in the fall, is called RealNet Rules.

RealNet Rules is a policy server that employs a graphical user interface to apply quality of service (QoS) and security policies to people culled from the NDS directory server. The rules are stored in the NDS directory server.

Technically, the rules are put in place by using a Lightweight Directory Access Protocol (LDAP) interface between the RealNet Rules policy server and the directory server. To apply the policies to network devices, you click an activation button and the policies are sent from NDS to the network devices. The devices then apply the policies to the traffic flowing through the routers and switches on the network.

RealNet Rules is installed as an application on Windows NT or Solaris, usually in a network management center. NDS can be on the same server or on a server locally accessible to it.

Lucent says RealNet Rules will be able to work with all devices in the Cajun switching family of multilayer LAN switches, as well as Cisco Layer-3-capable devices equipped with IOS Version 11.2 or higher. The switching products are expected to ship in the third quarter.

Parker-Johnson says Lucent will announce integration with other devices, including Lucent's WAN switches. With management in mind, Lucent is integrating NDS and LDAP into its QIP IP Address Manager. QIP IP Address Manager is a tool that lets network managers set up systems for grouping and allocating IP addresses throughout networks. The QIP product came from Lucent's acquisition of Quadratek Systems last year.

QIP IP Address Manager is shipping now, and its cost is based on the size of the server and the number of addresses in your network. QIP starts at a few thousand dollars and can go up to $100,000 for very large enterprise networks, Parker-Johnson says.

Lucent's most innovative tie-in with NDS is NDS' integration with Lucent's Definity enterprise voice switching product line. This integration means objects such as user names, application names or policy rules can be stored once in a directory system and reused by a variety of different network products.

Lucent also plans to use NDS in its Intuity line of integrated messaging servers in the same way.

One goal is to integrate diverse network systems into a common information infrastructure, which should simplify administration. Also, network managers should be able to deploy new services faster by using a common directory.

Nortel has a joint development and marketing agreement to integrate NDS with Nortel's Optivity Policy Services policy management application suite. Users will be able to deploy QoS by tying NDS' user information to Nortel's gear. The product will work with any routers using BayRS 13.20 or Cisco 11.0 routing codes.

Nortel will bundle NDS with the Optivity suite, which is slated to ship this month. The first version will list for $25,000 and will control multiple servers.

According to Michael Simpson, director of strategic market planning at Novell, more than 400 applications are being developed to work with NDS directly. He points out that many other applications that use an LDAP interface will also interoperate with NDS.

***"We can take the technology that previously was dependent upon IP and now configure it by a user's identity."***

Michael Simpson, director of strategic market planning, Novell

"We can take the technology that previously was dependent upon IP and now configure it by a user's identity. So we move from the physical to the logical, and the logical is more consistent and more flexible," Simpson says.

Some other major NDS partners are Oracle, IBM, Tivoli, Texas Instruments (TI), Dell, Compaq, AT&T and other international telecommunications companies.

Cabletron has agreed to integrate its Spectrum management services with NDS, although no shipping date has been set.

IBM will integrate NDS with its Websphere Web server, Oracle will tie in certain databases and Tivoli will work with NDS for software distribution.

Earlier this year, TI announced it will create a software developer's kit to integrate the firm's digital signal processors with NDS. That could mean NDS management of all kinds of portable devices, from cellular phones to handheld computers. Novell's Simpson says 80% of all digital devices shipped in the U.S. last year came from TI and that TI has more than 45% of the global market as well.

Similarly, Oblix is developing software that can use NDS as a general-purpose directory, not just something specific to networking.

"The biggest win for Novell users is that the infrastructure they've deployed over a long period of time can be leveraged in new ways for apps that are more than just network applications," says Ron Palmeri, vice president of business development at Oblix.

One application, Corporate Services Automation, lets you publish information in the directory to manage directory content for users on intranets and extranets. The lastest Version 3.6, which is NDS-enabled, is in beta and will ship in the third quarter. ◪

### In Novell's tree

**A sampling of some companies with which Novell has signed a licensing partnership for NDS.**

- Oracle
- IBM
- Tivoli
- Texas Instruments
- Dell
- Compaq
- AT&T
- Deutsche Telekom
- Lucent
- Nortel Networks
- Cabletron
- Oblix

# Technology Update

**An Inside Look at the Technologies and Standards Shaping Your Network**

## Ask Dr. Intranet

*By Steve Blass*

Three or so e-mails I've received in the last week reminded me that not all network executives recognize the benefits of having an intranet. One reader writes: "What are the advantages and disadvantages of an intranet? I need answers urgently and quickly."

In general, the advantages are improved internal communications and less work for human resources departments in setting up communications channels. One advantage is the ability to make a wealth of HR materials, such as expense forms and applications, available to employees through their Web browsers. In addition, online document exchanges and workflow management processes, in conjunction with digital signature technologies, can significantly reduce paperwork-processing cycle times.

The disadvantages of using an intranet include getting caught up in whiz-bang technology instead of doing real work. Dedicating highly skilled people to the task of putting HR forms online, when business-critical computing issues, such as server availability, need tending to, can lead to a negative return on intranet investment.

Most IT management teams won't let this happen for long, but there is danger in pushing the envelope of technology in search of capabilities whose return to the bottom line have not been clearly identified and balanced against the day-to-day needs of the organization.

*As a network architect at Sprint Paranet in Houston, Blass understands the strain of developing and managing intranets. Send your problems to drintranet @paranet.com.*

# Getting more bang from your routers

BY ALAN HUANG AND SANDRA GITTLEN

A new way to string routers together across the Internet, or an enterprise network, could save companies money and reduce traffic congestion.

The approach used by these Galois networks differs from the practice of employing expensive high-end routers linked together over ever-lengthening paths. Instead, Galois networks comprise router arrays, or so-called metarouters, which are clusters of inexpensive, off-the-shelf routers connected together. These metarouters work in much the same way that a RAID system connects storage devices.

Just as computers can be hooked together to act as a single supercomputer, metarouters let users harness their routing power without upgrading equipment every few months. And because Galois nets are based on a nonproprietary architecture of physical connections, users can implement the technology without waiting for vendors to include it in software.

The routers in a metarouter are linked using group theory mathematics. Developed in the 19th century by Evariste Galois, group theory states that a finite set of numbers creates a pattern that repeats itself predictably. Applied to clusters of routers, this means that a defined set of routers hooked together in a minimal amount of rows and columns will guarantee fault tolerance and redundancy — two critical elements in a large network.

To determine how the ports should be connected, a computer program, included in the Galois patent or supplied by a vendor, generates a wiring diagram based on the number of external ports a user needs and the number of ports in the routers they will be using. The program uses a formula derived from group theory to calculate which port in which row to connect to a port in a subsequent row.

In today's nets, overloaded routers drop packets, causing massive congestion. Traffic that traverses a Galois network is spread across the metarouter array so if one router becomes congested, the packets can be rerouted instantly to avoid packet loss and bottlenecks.

Galois networks can handle voice and video traffic. Neither data type can tolerate the jitter and delay caused by the retransmission of packets. Also, traditional nets suffer from port blocking, where collisions can cause a domino effect with other traffic. Because traffic in a Galois network is spread across the minimum number of routers, the chances of packet collisions are reduced.

Galois networks are also highly scalable. In a traditional net, when routers are added, the time it takes packets to reach their destination is increased because they have to make more hops. But in a metarouter array, routers can be added to rows without increasing the hops.

Also, to increase fault tolerance, users can add a row of routers without having to reconfigure the other routers in the array. Because metarouters know how to shift traffic without losing bits, if a router fails, or one needs to be added, it can be swapped in without having to take the net down.

Metarouters can include a combination of products from a variety of vendors. The Galois technology has been offered to several firms for adoption in router gear, but none has accepted. The approach runs counter to the marketing pitch vendors use to sell bigger and faster equipment. However, users can implement Galois using the instructions in the patent (See DocFinder 3633).

Also, the Advanced Research Project Agency at the U.S. Department of Defense is studying the technology as part of its Next-Generation Internet project.

*Huang, a former Bell Labs researcher, holds the patent for the Galois network and its metarouter technology. He is also the founder of Terabit Corp. in Menlo Park, Calif. He can be reached at alan@isl.stanford.edu. Gittlen is managing editor of Network World Fusion and can be reached at sgittlen@nww.com.*

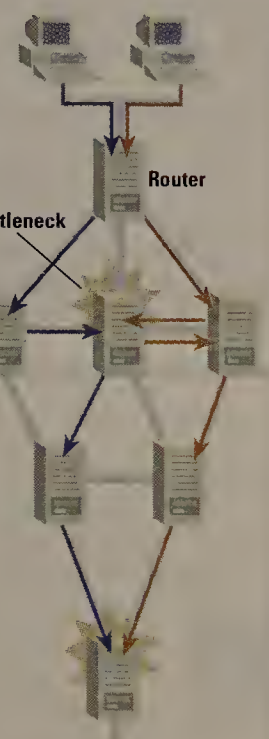
## HOW IT WORKS

### Galois network

**As the Internet grows ever larger, routers will be added to handle the traffic. But there may be an alternative: Galois networks. Galois networks use group theory mathematics to assemble arrays of routers that are less complex and promise to be less expensive to run than traditional routers. Galois nets can be built using off-the-shelf routing technology.**

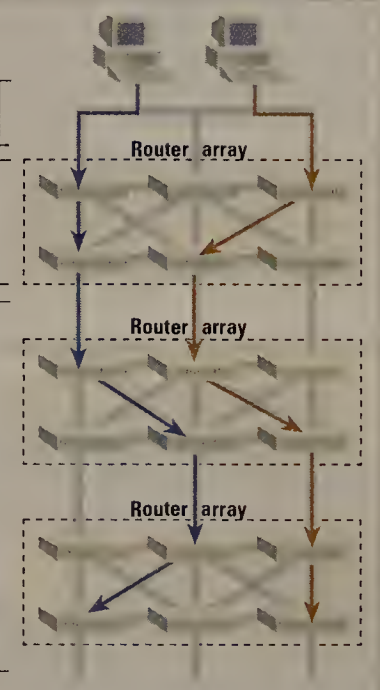
**Existing router networks**

1. Packets enter a router that has many forwarding options.
2. Packets can then travel over multiple paths and across router hops before reaching their destination.
3. As the network grows, paths lengthen, response time slows and bottlenecks occur.




**Galois networks**

1. Packets enter the router array, a group of connected routers acting as one router.
2. Using group theory mathematics, the array spreads traffic across the connected routers, reducing the likelihood of packet collision. Inside the array, routing paths are shorter, router lookups are fewer and faster than in traditional routers, and redundancy is guaranteed.
3. A series of these router arrays could reduce large network congestion and reduce packet loss.



Gearhead — inside the network machine . Mark Gibbs

# ANOTHER PING PACK AND MY FAVORITE NEW PORTABLE PC

Following last week's discussion of ping utilities, Gearhead would like to pass on the following trivia. According to Bob Quinn, one of our well-informed readers:

"Packet Internet Groper" is not actually the derivation of the "ping" acronym. According to the original author, Mike Muuss, it was named after the sound submarine sonar makes. It isn't an acronym at all.

Quinn suggested checking Mike Muuss' Web page at http://ftp.arl.mil/~mike/ping.html, which is not only informative but also very amusing.

Be that as it may, Gearhead was contacted by one company, Ipswitch, Inc., with an offer to look at its utility called WS_Ping ProPack. Having previously used Ipswitch's fine File Transfer Protocol utility, WS_FTP, we could hardly resist.

WS_Ping ProPack (www.ipswitch.com/products/WS_Ping/index.html) is neither a graphical tool nor just a ping utility, which makes its name somewhat misleading. In the package you get something called the Info tool, which displays information about a network host or device, including the official hostname and

IP address. The tool also checks the Internic Whois database for host contact information and pings the host to check if it is there.

But that's not all. ProPack is a sort of TCP/IP Swiss Army Knife. It can also check network time servers and synchronize your PC clock; retrieve raw Web content so you can examine header data; perform traceroute tests (which determine the IP address and ping time for all intermediate nodes to your destination); perform Domain Name System and finger lookups; and perform Lightweight Directory Access Protocol queries. ProPack also has the ability to check an IP address range for active ports (called a "port scan"); retrieve SNMP data; analyze Windows networks; measure end-to-end throughput; and retrieve a quote of the day from a quote server. Cool.

You can even format ProPack output in list or report view. The latter can be simply copied to the clipboard and built into a report or sent to someone to prove your connection is not performing as expected. If only WS_Ping ProPack could graph its findings and perform continuous traces (currently the maximum number of iterations for any function is 32,768).

Gearhead really likes WS_Ping ProPack, and for $37.50 we think it's a good value. It receives four gear teeth out of five.

As excited as we are about ProPack, what has us really cranked up is a new toy: Sony's Vaio C1 sub-laptop. Before we get into the details of this miracle, who was the genius who named the product with a word that can't be pronounced (vi-o? vow? vayo?)?

Griping aside, the C1 is fabulous. It has a perfectly workable, albeit small, keyboard; an odd screen size (1024 by 480 pixels, but what a great screen!); and a small size (9 by 1 by 5 inches and only 2.4 pounds). It sports a 266-MHz Pentium with MMX; 64M bytes of RAM; built-in V.90 modem; a gazillion ports (serial, video, USB, PC Card, IR, etc.); and, to top it off, a built-in camera (see www.ita.sel.sony.com/products/pc/notebook/pcgc1x.html for the full specification).

The camera can take stills or shoot videos up to 1 minute long, and the C1 comes with image manipulation and cataloging software. The pictures and clips can also be e-mailed directly from the video-capture utility interface.

Gearhead was going to test Microsoft's NetMeeting on the C1, but the Microsoft Web site kept giving us VBScript run-time errors when we tried to go to the NetMeeting. This doesn't seem to be too unusual for the Microsoft site. We are inclined to think that the Microsoft Webmaster needs a clip around the ear.

The C1 ($2,300, estimated) is a tremendous product for mobile users, and its diminutive size ensures that when the guy in front of you reclines his airline seat your screen won't get crushed. Gearhead gives the Sony whatever-it's-called C1 five gear teeth out of five. Outstanding.

*Toys and tools to gh@gibbs.com.*

## Seek and ye shall find

We admit it: finding past articles or specific information on Fusion hasn't always been the easiest thing in the world ("needle in a haystack" comes to mind). That changes this week, though, when we switch to a new search engine.

We're ditching our old Excite software for Ultraseek, the commercial version of Infoseek's search engine and spider. With Ultraseek, you'll be able to find just what you're looking for in any number of ways. It supports true Boolean searches, as well as the simpler type of search used by AltaVista and Infoseek (searches defined with plus and minus signs). You can sort results by date, or further refine them with additional keywords. If you know an article's headline, there's a shortcut for getting right to the article.

And Ultraseek does something that makes some of us grizzled search-engine users incredibly happy: If you type in "AT&T," you actually get back stories about AT&T. For some reason, many search engines just refuse to deal with the fact that ampersands are part of the written language. This includes not only the version of Excite we used, but also some major public search engines, such as Lycos (try searching for AT&T on Lycos; we dare you!).

Installation was pretty straightforward. Administration looks simple as well — Ultraseek's spider crawls our site once per day, so we don't have to worry about running any update scripts. To get the date sort working correctly, however, we had to download lots of articles and embed the publication date in them with a meta tag (otherwise, Ultraseek would use the date the file was indexed, not the date it was published).

And there was the little bug with our dynamically generated forums, which sent Ultraseek into a URL-generating frenzy, to the point it generated some 400,000 URLs based on those forums. It would have generated even more, but all those URLs filled up the disk, effectively crashing our server.

You can do a quick Ultraseek search on any Network World Fusion page via the search box in the upper left-hand corner. You'll also find a link to an "Advanced Search" page that will bring up extra options as well as help files.

Stay tuned for more!

## Help Desk

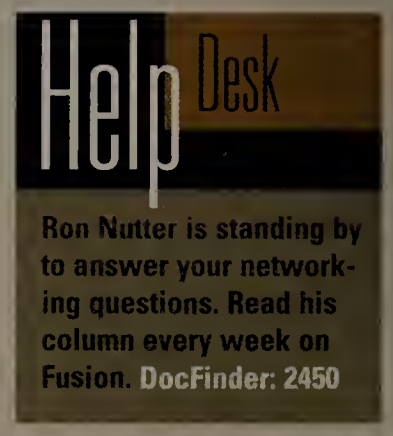
A reader who works at a company about to merge with an overseas organization needs advice on how to create a WAN to connect the two divisions. Both use a variety of protocols, including IP and IPX, and NT and NetWare servers. What protocol should he use to unite the continents? See what Help Desk Editor Ron Nutter suggests and add your own advice.

*DocFinder: 3631*

## Download of the week

EcoNets is a stand-alone tool for modeling, analyzing and designing voice, ACD, narrowband-data, broadband-data, personal communications services and TCP/IP networks. It runs on Windows and Macintosh machines. Download an evaluation copy of this and other design tools.

*DocFinder: 3632*

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# Opinions

Editorial Insights

## Users and carriers split on managed services

To hear service providers talk, the future is managed services. Service providers will do more than just provide transmission, they will manage the gear at your sites, handle quality of service throughout the network and dynamically reconfigure the pipes to meet the changing needs of your applications. They may even host all those applications for you.

That makes a lot of sense in theory. It helps the service providers rise above the brutal price wars for pure voice and data transmission, and makes it easier for them to lock in customers. Once they've got you by the apps, it'll be tough to turn back. For customers, handing the WAN job over to the service providers could be a boon. With network traffic exploding and resources growing at a snail's pace, outsourcing the WAN could ease the pressure.

So why aren't customers buying into it?

I've done six cities now on our State of the WAN seminar tour, and when I ask people in the audience if they are buying, or considering buying, managed services, very few hands go up. Some doubt the service providers' ability to deliver on the promises — they've heard this siren song before, and carriers haven't come through. Some think they'll be constrained from using the latest technologies — held back by the service provider's deployment schedule. Others realize that their organizational structures just aren't set up for this sort of arrangement — everyone is focused on specific devices and services, but no one is exploring managed services.

The vendor panelists — half equipment makers, half service providers — in our roundtable acknowledged these issues and most felt that they would be overcome. But when I pressed them on when managed services would really begin to take off, the answers ranged from 2002 to never.

That's too bad. Most companies should be planning to get out of the business of building private WANs, and putting their limited resources into developing the e-business applications that will bring in revenue and profit.

If you're smart, you'll start experimenting with managed services — managed LAN services, virtual private networks, managed frame relay — and start building a rapport with your service provider's account team. You both have a lot to learn, and you'll have to establish a bond of trust.

But there will be a huge payoff for the early adopters here, and you can be one of them.

— John Gallant
*jgallant@nww.com*

Message Queue

## INTEROPERABILITY UPDATE

I'd like to clarify and build on the information contained in your article "DSL: Can't we all get along?" (June 14, page 1). The article is about the results of the DSL-Lite interoperability showcase demonstration at SuperComm '99.

I believe you reported partial results regarding interoperability achieved using Lucent Technologies Microelectronics Group's modem communications chipset technology. The article is correct in noting that Lucent, using a six-port kiosk provided to us as part of the demonstration, achieved interoperability with six out of a possible six digital subscriber line access multiplexers (DSLAM) attached to that kiosk. The participating companies included Alcatel, ECI Telecommunications, Nortel Networks, Samsung Telecommunications America and Siemens (one DSLAM manufacturer with which we interoperated would not allow us to release its name). From the showcase area, Lucent also achieved verifiable connections with equipment from DSLAM manufacturers Ericsson, Hyundai Electronics, Newbridge Networks and PairGain Technologies, for a total of 10.

Lucent's WildWire DSP1690 modem chipset, used for customer premises equipment (CPE) applications, achieved interoperability with 10 different DSLAM equipment manufacturers that were using chips manufactured by non-Lucent companies. This demonstration proved that Lucent's modem chip achieved interoperability with more DSLAM manufacturers using non-Lucent modem chips than any other participating company's CPE modem chips did with DSLAM modem chips made by other companies.

Modem users typically are not interested in knowing that one brand of modem — using three different manufacturers' chipsets — achieved interoperability with a cross-section of DSLAMs. They want to know whether any modem they buy containing a chipset from Company X is able to connect to any other modem their service provider is likely to have installed at the central office.

*Tony Grewe*
*Marketing director, strategy and business development*
*Lucent Technologies Microelectronics Group*
*Allentown, Pa.*

## ALIVE AND KICKING

In response to the article "Frame relay at the crossroads" (May 31, page 1), I'd like to provide some clarification to readers as to what's going on within the Frame Relay Forum.

Frame relay is not dead, and the Frame Relay Forum is not shutting down.

The Frame Relay Forum is made up of a technical committee and international Market Development and Education (MD&E) committees. The technical committee defines implementation agreements that specify the various aspects of communications involved in the technology. The primary role of the MD&E committees is to promote the use of frame relay products and services and to further worldwide market awareness of the technology. The phenomenal growth of the international market for frame relay equipment and services is a compelling testament to the success of the forum and its hundreds of worldwide affiliate and auditing members.

As we prepare to enter 2000, it's natural to take stock of things in order to assess what is and isn't working; what needs a change or jump-start; and what's working just fine as is. The primary questions the Frame Relay Forum's board of directors is considering are: How should frame relay evolve from where it is today, and how can the Frame Relay Forum best meet the needs of its members and the industry?

In making decisions about the future of the Frame Relay Forum, we actively solicit the views of all our members. Discussions at the recent annual meeting in Las Vegas and those planned for the technical committee and North American MD&E committee meetings next month in Montreal, are intended to stimulate dialogue among members and encourage active and candid evaluation.

Rather than sending a message that frame relay is dead or that the Frame Relay Forum is shutting down, we believe that this introspection is essential to our goal of continuing to effectively meet the evolving needs of our members and the industry.

*Lori Dreher*
*President and chair*
*Frame Relay Forum*
*Fremont, Calif.*

*Send letters to nwnews@nww.com or John Gallant, editorial director, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*


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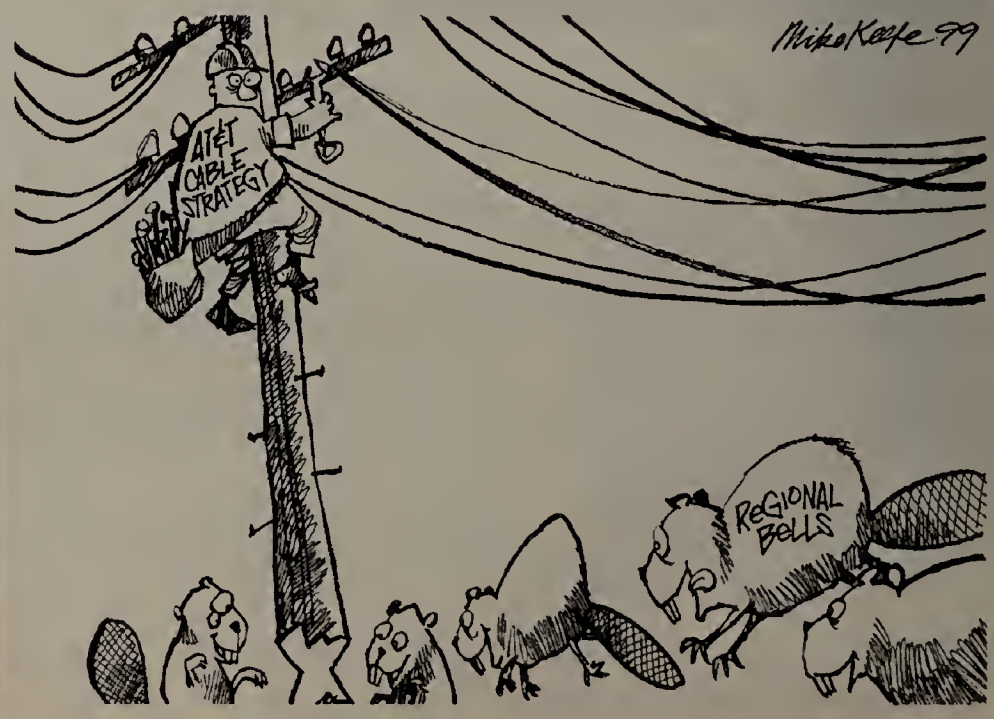

Bottom Line . Joel Snyder

# SERVICE-LEVEL AGREEMENTS: NOTHING BUT NONSENSE

If you think the service-level agreement you have with your ISP means something, think again. Read through the fine print and you'll discover the SLA contains a whole lot of PR and not much substance.

Major ISPs, such as AT&T, PSINet and UUNET, offer SLAs to some of their customers. SLAs have two parts: the service, which may include guarantees on availability, latency, support, throughput and even security; and the penalty.

Let's start with the penalty. I have yet to see a penalty that gives the carrier a proper slap in the face. In fact, some of the first SLAs I saw were positively laughable: If your Internet connection is down for an hour, then you don't have to pay for that hour. Now some SLAs offer a bigger bonus: If your service is down for an hour, you don't have to pay for that day.

Well, if a business-critical service is cut off for an hour, I don't see why I should pay for the entire month. Remember, people go to the AT&Ts and PSINets of the world because they want big-company performance. If you're paying the big guys two to three times the going rate for Internet service, you deserve to have it running 24 hours a day.

The whole point of an SLA is to provide some incentive for the carrier to do a good job. If a multihour outage only costs the carrier a couple hundred bucks, then we're going to keep seeing multihour outages.

But when the potential cost for downtime starts at thousands of dollars and goes up from there, the people making decisions about equipment and engineering are going to take their jobs a lot more seriously — and have a better argument for getting more cash out of the bean counters to improve the infrastructure and support team.

But let's back up. The real problem with SLAs is the definition of service. UUNET has made great hay with its SLA, so I'll pick on it for a bit — even though UUNET is not the worst offender.

What UUNET calls an SLA is really just a description of the service you've bought and paid for, with UUNET essentially promising to run its network as best it can. That's easy. The hard part of being an ISP is dealing with end-to-end problems. And that's where UUNET's SLA and all the others leave me in the lurch. Try calling UUNET's help desk and say you're having problems connecting to, say, CERFnet. Most likely, the help desk will dodge responsibility: "Oh, that's a problem at MAE East." "Oh, that's CERFnet." "That's a BGP problem."

Well, I don't give a damn where the carrier wants to stick the blame. If I'm paying UUNET, I expect it to act as my representative to the rest of the world and get my packets through, on time, without loss or corruption. That would be service. And friends, that's what you're not going to get, SLA or no SLA.

*Snyder, a Network World Test Alliance partner, is a senior partner at Opus One in Tucson, Ariz. He can be reached at jms@opus1.com.*

The Intelligent Network . Mary Petrosky

# POLICY CAPABILITIES HELP DRIVE RSVP'S RENAISSANCE

Just when you thought it was safe to ignore the Resource Reservation Protocol (RSVP), the industry is looking to exploit this signaling scheme for everything from quality of service (QoS) to traffic engineering to policy-based management. Fortunately, the renewed interest in RSVP is prompting the Internet Engineering Task Force (IETF) to address some of the protocol's shortcomings.

RSVP was conceived as a mechanism for allowing applications that require specific QoS, such as IP telephony, to request resources from a network. RSVP messages carry information about the sender that is requesting resources, how to identify the traffic being sent, and the level of service that user's traffic needs. RSVP also has two other capabilities that are driving renewed industry interest: admission control and policy control.

Nearly two years ago, the IETF published guidelines indicating that wide-scale RSVP deployment must be approached with care. One of the key issues the IETF discussed was RSVP's scalability. For example, the group raised concerns about the processing and storage burden that RSVP places on routers because each RSVP-capable router must track every RSVP session, or traffic flow, between each pair of senders and receivers. In addition, senders and receivers must periodically send messages to keep their reservation active. Such refresh messages can add to network traffic if a lot of reservations are in use.

One way around the scalability problem is to have RSVP deal with aggregates of traffic flows rather than individual flows. The IETF Multi-protocol Label Switching (MPLS) working group recently proposed this change as part of its work defining standards for explicit routing. Likewise, the MPLS working group has proposed extensions to RSVP to reduce the protocol's processing requirements, "chattiness" and latency, as well as to improve its reliability.

These changes are intended to make RSVP usable as the signaling mechanism for setting up explicit routes — with or without resource reservations — in service provider networks. This represents a major shift in attitude regarding RSVP, which the industry to date has promoted solely for use in the enterprise environment. Needless to say, if the IETF can make RSVP more scalable, it will potentially open up the technology for use in very large networks.

It's unclear whether the scalability enhancements to RSVP will encourage service providers to use the Integrated Services type of QoS or simply exploit RSVP signaling for explicit routing. Many industry players still see the Differentiated Services (Diff-Serv) approach, with its simpler, priority-based class-of-service (CoS) capabilities, as the primary QoS mechanism for use in service provider networks.

However, other vendors and industry players are interested in using RSVP and Diff-Serv in a complementary fashion. For example, host systems within an enterprise could use RSVP to ensure that key applications get the bandwidth, jitter control and other QoS requirements they need. At the border to the service provider network, RSVP QoS would be mapped to Diff-Serv.

More importantly, RSVP can be used to carry admission and policy control information. That is, RSVP can carry messages that enable RSVP-capable nodes to determine whether enough resources are available to meet a particular QoS request, and whether a particular user is allowed to make a reservation. Rather than simply carrying QoS information, RSVP can be used to trigger policy checks within enterprises and at the border of service provider networks. For example, RSVP signaling would be used to admit packets into a Diff-Serv domain.

Microsoft officials and other speakers at the recent iBand2 conference in San Francisco made it clear that they plan to exploit the admission and policy control aspects of RSVP. Microsoft is supporting RSVP in its operating systems, which will enable Windows hosts to generate RSVP messages containing user ID and other policy information. The firm also is working on admission control server technology that will extract policy information from RSVP messages — a function that will also be performed by network devices, such as routers. The admission control server will then use the Lightweight Directory Access Protocol to check policy data in Active Directory, which will indicate whether a given user's or application's RSVP or other QoS-related request should be permitted or denied.

Try to learn as much as possible about Microsoft's RSVP plans and evaluate what role RSVP might play in your organization's CoS, QoS and policy strategies. Likewise, RSVP may be a key technology at the enterprise-service provider boundary, where its admission control and policy aspects potentially would be more important than its particular QoS capabilities.

*Petrosky is an independent technology analyst in San Mateo, Calif. She can be reached at mary@mpetrosky.com.*

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Feature

# GIGABIT CHOKE POINTS

BY JEFFREY FRITZ

Expecting Gigabit Ethernet to vanquish your LAN bandwidth problems?

Keep your excitement in check. While carefully implementing Gigabit Ethernet can enhance overall network performance, the technology may not be the panacea you expect because your clients and servers probably aren't powerful enough to take full advantage of its capabilities.

Gigabit Ethernet doesn't have the contention problems of conventional Ethernet because it is usually deployed as a switched technology like 10Base-T and 100Base-T. But other factors conspire to lower throughput.

Just how much lower was what we at West Virginia University's (WVU) Advanced Networking Lab set out to determine. We intentionally side-stepped the issue of Jumbo Frames — use of which speeds Gigabit Ethernet by reducing overhead — because we were curious to see what kind of performance we could achieve with plain vanilla Gigabit Ethernet right out of the box (for more on the Jumbo Frames, see "In defense of Jumbo Frames," *NW*, Aug. 8, 1998).

At the same time WVU was conducting its performance tests, Brian Norris, a senior hardware engineer then working at Wandel & Goltermann, was independently testing bandwidth utilization and throughput on Gigabit Ethernet and Fast Ethernet links. When the two organizations met at the Gigabit Ethernet Conference in San Jose, we learned of each other's testing and compared notes. Our results were surprisingly similar and not good news for organizations considering making the gigabit leap.

## Real-world Fast Ethernet

To give us a baseline to compare our Gigabit Ethernet results against, we began by seeing how much throughput we could achieve with Fast Ethernet. Transferring a noncompressible 36M-byte file using a Novell server, we obtained an average bi-directional throughput of 18M bit/sec when communicating with a Windows 95 client and 22M bit/sec when talking to a Windows NT client (see graphic, page 36). The same test was performed using a NT server. This time, the Windows 95 client saw 16M bit/sec average bidirectional throughput while the NT client yielded an average throughput of 25M bit/sec.

***Taking the measure of Gigabit Ethernet.***

When Norris transferred a 40M-byte file between two Windows 95 machines, the File Transfer Protocol tool and the Wandel & Goltermann DominoFE tester he used both reported throughput of 16M bit/sec.

Remember, all this was done on a 100M bit/sec full-duplex link dedicated to this test.

Curious to discover why network performance was so feeble, Norris used Domino's Examine function to inspect the traffic in detail. It was obvious that there was a long delay time between TCP transfers and TCP acknowledgments. IPX delays were just as sluggish. The delays caused a significant drop in performance for both protocols. Norris saved a capture file containing a large chunk of the transfer and then moved on to the Gigabit Ethernet test.

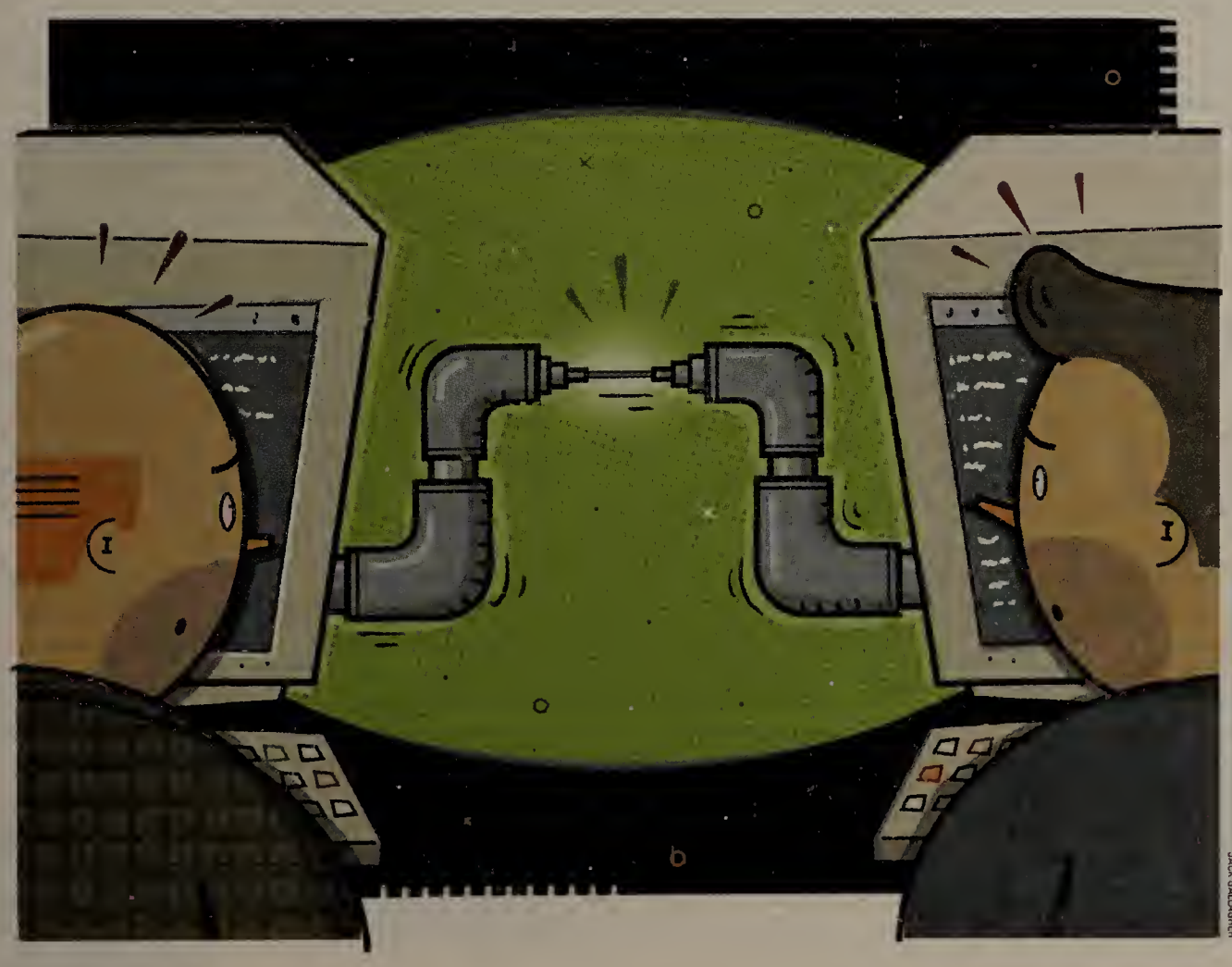
Given the lackluster performance observed in the Fast Ethernet test, neither our team nor Norris expected a huge performance increase from Gigabit Ethernet. We were right. Norris' test revealed a disappointing 20M bit/sec throughput — a mere 20M bit/sec out of a possible 1,000M bit/sec!

Once again, Norris ran detailed analysis on the captured gigabit traffic using Domino Examine. Although the acknowledgement delays were shorter than with Fast Ethernet, they were still apparent.

We fared only slightly better, with the average bidirectional performance with the Novell server using NT and Windows 95 clients hovering around 25M bit/sec. The NT server's performance with the Windows 95 client was 21M bit/sec.

The NT server and NT client combination performed somewhat better at 29M bit/sec.

In short, network bandwidth utilization was poor on Fast Ethernet, never exceeding 25% of network bandwidth, and was downright lousy on Gigabit Ethernet, never exceeding 3% of available bandwidth. Utilization figures such as this should give pause to anyone expecting a dramatic boost from an upgrade to Gigabit Ethernet.




## The bottlenecks

Network performance is affected by a host of PC factors, including bus speeds, interrupts, hard disk read/write speed and protocol stack processing. While most of these are not significant for 10Base-T, they begin to become factors with Fast Ethernet and really become issues with Gigabit Ethernet. Even though we were using reasonably fast PCs, CPU and memory usage were frequently maxed out during our tests. It appears that most of the system's resources were devoted to processing the packets and reassembling the file.

But there are a host of other potential choke points besides the CPU and memory. Network interface card (NIC) hardware and drivers, for example, are often a weak link in the chain. A poorly performing NIC can easily become a network bottleneck, though even the fastest, most efficient NIC does not guarantee top-notch network performance.

Often the problem is the protocol stack. When a machine needs to send a file across an IP network, the file is broken up into small pieces by TCP. A TCP checksum is calculated for the fragment, and then it is passed on to the IP layer. IP encapsulates the fragment, calculates another checksum, and passes the newly formed packet down the line.

On the receiving end, the IP layer recalculates the checksum to ensure the integrity of the packet, strips off the IP encapsulation and passes the fragment to the TCP layer. The TCP layer recalculates the TCP checksum to ensure integrity of the fragment and awaits the arrival of the rest of the fragments so the frame can be reassembled.

It is easy to see that a significant number of calculations are involved in packet processing.

In many workstations and servers, checksum calculations and packet processing are largely conducted in software. Administrators first noticed the effect of software packet processing when Fast Ethernet arrived on the scene. For the first time, the pipe between the machines was large enough to unmask a stack-processing problem, where before the network was thought to be the only cause for poor application performance.

The reality is that software stack processing is inefficient. As such, it becomes a constant delay in network performance, regardless of how much you increase the bandwidth between machines.

Need further proof that processing packets in software is inefficient? Simply look inside any high-performance network switch. You will notice that packet processing is conducted in specialized hardware called Application Specific Integrated Circuits (ASIC). Processing packets in on-board silicon is always faster than processing packets with software.

Now look inside your Windows workstation or server. Except for ASICs that are just now beginning to appear on select NICs, you'll find that packet processing is done entirely in software. That's why switches can process packets at Gigabit Ethernet wire speeds while PCs can not.

### Stacking up Fast Ethernet against Gigabit Ethernet

**West Virginia University's Advanced Networking Lab tested network performance by using Novell and NT servers to pass a noncompressible 36M-byte file to and from Windows 95 and Windows NT clients.**

**Fast Ethernet: 100M bit/sec**

| Server/client | Measured throughput (in bit/sec) | Bandwidth utilization |
|---|---|---|
| Novell/Windows 95 | 18 | 18% |
| Novell/Windows NT | 22 | 22% |
| NT Server/Windows 95 | 16 | 16% |
| NT Server/Windows NT | 25 | 25% |

**Gigabit Ethernet: 1,000M bit/sec**

| Server/client | Measured throughput (in bit/sec) | Bandwidth utilization |
|---|---|---|
| Novell/Windows 95 | 25 | 3% |
| Novell/Windows NT | 24 | 2% |
| NT Server/Windows 95 | 21 | 2% |
| NT Server/Windows NT | 29 | 3% |

### Other limitations

Because many operating systems force protocol stacks to be run completely in software, the operating system plays a significant role in network performance. Without improving protocol stack performance, any operating system will experience mediocre network performance regardless of how much network bandwidth is available.

For example, when Windows NT Workstation is communicating across the net, the operating system is involved in nearly every network-related action. As a result, Windows NT Workstation sets no speed records when it comes to networking.

Other operating systems, such as Mac OS and Windows 9X, are no better. Because much of a Unix workstation's packet processing is performed in hardware, Unix is often the preferred operating system for many network devices. Unfortunately, the operating system is not the only limitation to network performance in today's PC. Issues such as CPU utilization and bus speed come into play, as well.

Let's do the math. If performance equaled bandwidth, PCs would receive packets from Fast Ethernet at 100M bit/sec. One MHz equals roughly 1M bit/sec. In the latest generation of PCs, the system bus runs at 100 MHz, but older PCs have a 33-MHz or 66-MHz bus. A 33-MHz bus simply will not cut it even for Fast Ethernet speeds because the 100M bit/sec network is feeding into a bus operating at approximately 33M bit/sec.

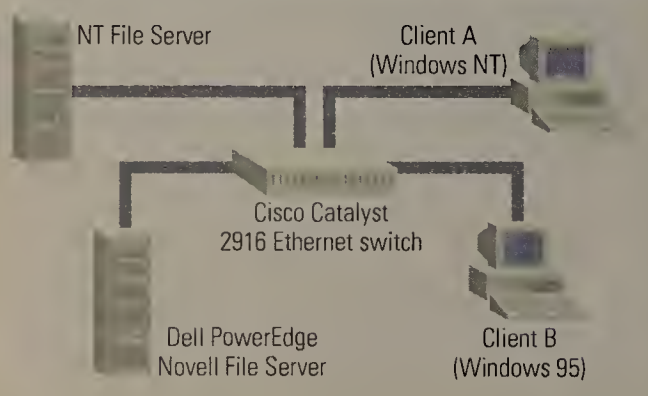
Now let's increase the throughput demands by placing the PC on a Gigabit Ethernet connection. Gigabit Networks can deliver packets at 1,000M bit/sec, far more than the average PC bus can accommodate. In fact, with Gigabit Ethernet we can easily overwhelm the bus and CPU with network traffic. Not a pretty picture.

### Improvements on the way

The upshot, then, is that some network managers may be busily upgrading Fast Ethernet to Gigabit Ethernet when they are not even close to achieving the potential of the Fast Ethernet they currently use.

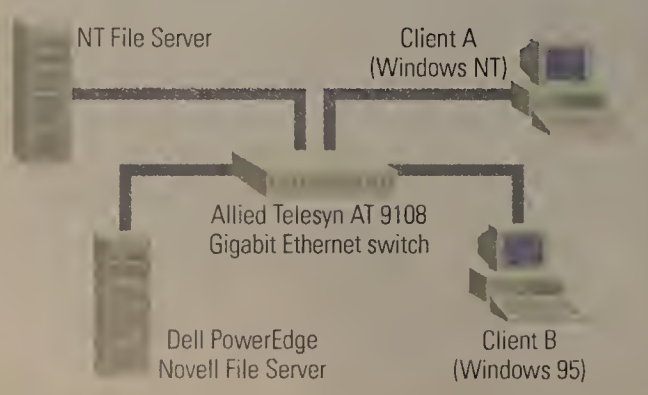
## Figure 1 — Fast Ethernet test configurations

**West Virginia University's Fast Ethernet configuration:**




## Figure 2 — Gigabit Ethernet test configurations

**West Virginia University's Gigabit Ethernet configuration:**




# THE TEST CONFIGURATIONS

**Figure 1**

West Virginia University's Advanced Networking Lab and Brian Norris — who was with Wandel & Goltermann at the time — started by testing Fast Ethernet using Intel Pro 10/100 PCI network interface cards (NIC) configured for 100M bit/sec full duplex operation. However, both shops took slightly different paths in their test configurations.

WVU tested Fast Ethernet first using a Dell PowerEdge server running Novell NetWare 4 connected to two clients through a Cisco Catalyst 2916 switch. One client was running Windows NT Workstation while the other ran Windows 95. The two clients ran on identical Dell Optiplex 200-MHz Pentium PCs with 64M bytes of RAM and standard Integrated Drive Electronics (IDE) hard disks.

WVU then replaced the Novell file server with a Dell Optiplex running Windows NT Server 4 connected to the same clients. Because we wanted to determine real world performance, we made no attempt to tune the performance of any of the operating systems.

Norris tested Fast Ethernet using two identical 166-MHz Pentium computers, both with 32M bytes of physical RAM and standard IDE hard disks, running Windows 95. In an attempt to reduce the number of variables in the network, Norris did not use a switch between the client and the server. Instead, he connected each PC to the monitor ports of a Wandel & Goltermann DominoFE Fast Ethernet analyzer. In full duplex monitor mode, the DominoFE can capture full line-rate data in both directions and provide full line-rate statistics. The analyzer did not impose any packet latency or line impairments.

**Figure 2**

This figure shows the test configuration used for the Gigabit Ethernet tests. WVU changed to an Allied Telesyn AT-9108 8-port 1000Base-X Gigabit Ethernet switch. A SysKonnect SK-NET GE-SX dual link NIC was installed in the Novell server and 3Com Gigabit EtherLink Server NICs (3C985-SX) were placed in each client and the NT server.

Norris installed Packet Engines G-NIC PCI Gigabit Ethernet adapters and replaced the DominoFE analyzer with a DominoGigabit analyzer. DominoGigabit has the same features as the DominoFE, but functions at Gigabit Ethernet rates.

All of the testing focused on client-to-server communications using PC-based devices. Server-to-server performance may fare better and may be more common on Gigabit Ethernet backbones.

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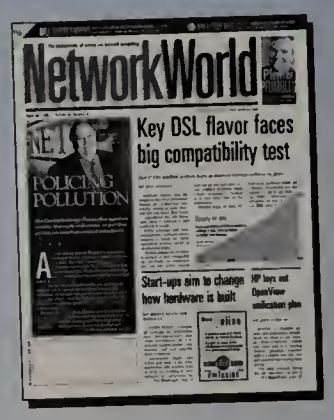


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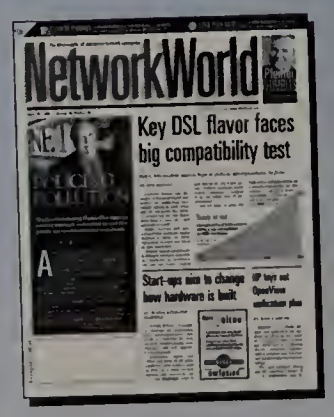


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This does not imply that Gigabit Ethernet is a poor technology. Rather, what we have is a situation in which the PC client simply needs to catch up with the network. By migrating to faster network technologies such as Gigabit Ethernet, we have succeeded in moving the bottleneck from the network to the PC.

Given this, how can we gain better Gigabit Ethernet performance? We can start with improved NICs. Newer NICs incorporate dedicated processors and Media Access Controllers (MAC) that are IP-aware, meaning they can process IP packets and perform IP checksum calculations using hardware. In addition, large First In First Out (FIFO) NIC memory buffers will increase performance by providing a buffer big enough to store a number of complete packets. All this boils down to reduced transaction time (often referred to as turnaround time) which decreases the constant delay in the network performance equation.

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The next step toward better performance is to convince operating system vendors to let go of packet processing. This may be a tough sell, but it is essential to get the operating system out of the packet processing business if we are to realize optimum network performance.

Finally, bus speeds inside PCs need to ratchet upwards. Even on systems with a 100-MHz PCI bus, the bus interface between the NIC and the rest of the system is most likely 33MHz and only 32 bits wide. Faster, wider system and NIC buses are needed to take full advantage of Gigabit Ethernet performance.

Happily, some high-end servers are appearing with 64 bit/33MHz and 64 bit/66MHz buses. The wider bandwidth and increased speed should enable these new machines to do a better job of keeping up with Fast Ethernet, though they don't approach the level needed for true gigabit performance.

With so much of the packet processing still tied to the operating system, these fast buses will be underutilized in PCs and servers. Operations such as interrupt processing frequently divert the CPU's attention and, as long as the CPU and the bus must become directly involved in handling individual packets, that will take a toll on network performance. Distracted by interrupts and other data processing requirements, a PC with the fastest modern bus cannot possibly process packets at wire speeds.

Until all of these improvements come together, the promise of end-to-end Gigabit Ethernet will remain much greater than the reality.

*The author expresses his appreciation to Brian Norris, senior hardware engineer at TTC Corp., for his assistance in the preparation of this article.*

*Fritz serves as the principal network engineer for West Virginia University. He is also the author of* Remote LAN Access: A Guide for Networkers and the Rest of Us. *He can be reached at jfritz@wvu.edu*

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Essentials of Network Technologies ... and their Practical Applications cuts through the maze of jargon across the LAN, MAN and WAN domains. This updated seminar is a dynamic, plain-English, common-sense and thoroughly understandable explanation of current and developing communications systems and networks. Acronyms are decoded, technologies demystified, standards put into perspective and trends explored. Step-by-step and technology-by-technology, the present and future networked world is set in the context of meaningful and cost-effective business applications.

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Get a handle on LAN networking: Bridges, Hubs, Switches and Routers

Understand Voice over Frame and Voice over IP: Does it make sense to talk over your data network?

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- Those new to networking and seeking a firm foundation
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- Nontechnical professionals in the disciplines of law, education, finance, marketing and public relations
- Decision makers seeking a big-picture perspective of broadband and high-performance networks ... in plain English

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BY BARRY NANCE

Review

# AN END TO DOWNTIME

***Vinca's software proved the most reliable for clustering NT servers, but no one gave us perfect 24-7 operation.***

What goes up must come down, but if your servers go down too often, your time as an employee may be up.

All servers fail from time to time, even when outfitted with high-availability hardware: error-correcting memory, multiple CPUs, RAID and redundant power supplies. Clustering software can help PC servers achieve levels of uptime and availability approaching that of minicomputers or mainframes by distributing server workload and replicating data across multiple shared hard disks or servers. Clustering software typically works through network adapters that sense the health of each server, but sometimes the software requires the presence of special hardware. When failure occurs, the clustering software identifies the failed unit and routes the workload to other machines. Ideally, users see no interruption of service.

To determine which clustering software adds the most reliability to an NT server environment, we tested products from five vendors. Vinca Corp.'s Co-StandbyServer 4.1 for NT was clearly the best clustering software for making NT Server a reliable and highly available platform. Co-StandbyServer gave us the closest to 24-7 uninterrupted operation of our PC servers and was easy to administer.

### Failure detection and failover

The key reason you would buy any of these products is reliability, so the ability to detect failures and work around them is crucial to their success. Co-StandbyServer discovered server failures more quickly and transferred control to our secondary servers more seamlessly than the other products we reviewed. It transparently mirrored not only data files, but also registry entries. This capability allowed a secondary server to quickly become an exact replacement for the primary server. In most cases, a slight pause in application responsiveness was the only sign that Co-StandbyServer had failed over to a secondary server.

| ScoreCard | Seamless failover 50% | Automatic fallback 15% | Manageability 15% | Performance 10% | Documentation 10% | Total score |
|---|---|---|---|---|---|---|
| Co-StandbyServer 4.1 | 8 x .50 = 4.00 | 7 x .15 = 1.05 | 8 x .15 = 1.20 | 5 x .10 = 0.50 | 7 x .10 = 0.70 | 7.45 |
| FullTime Cluster 4.3 | 7 x .50 = 3.50 | 7 x .15 = 1.05 | 7 x .15 = 1.05 | 5 x .10 = 0.50 | 5 x .10 = 0.50 | 6.60 |
| Windows Load Balancing Service | 5 x .50 = 2.50 | 7 x .15 = 1.05 | 5 x .15 = 0.75 | 7 x .10 = 0.70 | 6 x .10 = 0.60 | 5.60 |
| PowerSwitch/NT 4.0 | 4 x .50 = 2.00 | 7 x .15 = 1.05 | 8 x .15 = 1.20 | 7 x .10 = 0.70 | 6 x .10 = 0.60 | 5.55 |
| Backup Exec 7.2, Shared Storage Option, Replication Exec 1.5 | 5 x .50 = 2.50 | 5 x .15 = 0.75 | 3 x .15 = 0.45 | 7 x .10 = 0.70 | 3 x .10 = 0.30 | 4.70 |

**Individual category scores** are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

Vinca supplies replication and failover scripts supporting a variety of popular business applications, including Microsoft Exchange, Internet Information Server, SQL Server and Lotus Notes. The scripts tell Co-StandbyServer how to manage an application's data, how to detect whether the application is responding and whether the application dynamically updates NT's registry.

Legato's FullTime Cluster 4.3 for NT detected failures within 5 seconds, but sometimes it took as long as 20 seconds to transfer control to a secondary server. As with Co-StandbyServer and Windows Load Balancing Service (WLBS), each FullTime Cluster server is a working peer node, not a hot spare. We were able to configure FullTime Cluster to attempt to restart a failed server before it migrated the workload to the remaining computers. However, FullTime Cluster did not mirror dynamic registry updates, as did Co-StandbyServer.

FullTime Cluster's workload balancing performed well, and we were able to easily tune its control of key server resources. FullTime Cluster supports shared network disks and printers in addition to being able to replicate data, a feature unique to the product.

Windows NT Server Enterprise Edition 4.0's WLBS feature, which Microsoft recently acquired from Valance, runs as a Windows NT network driver and monitors and distributes network traffic among a cluster of servers. When a server in our cluster failed, WLBS automatically redirected network traffic to the remaining servers. Similarly, bringing the failed server back online caused WLBS to transparently rejoin the server to the cluster.

WLBS detected server failures within an acceptable 5 to 10 seconds but did not switch a failed server's active connections to other servers. Clients logged on to the failed server lost their connections. WLBS' biggest drawback is its lack of data replication among servers in a cluster. Because WLBS works at the network driver level and can't replicate data, we found that it worked best in a Web server environment.

Apcon's PowerSwitch/NT 4.0 was almost as quick at discovering failures as Vinca's Co-StandbyServer, but its approach of rebooting a secondary server following the failure of a primary server typically delayed application availability for users by a few minutes. Apcon claims the reboot helps restart applications more successfully than if control were simply switched to a different computer, but other clustering software products we tested did not have this problem. A combination of software and SCSI switch hardware, PowerSwitch/NT disconnects a failed server from its disk drives and, just prior to the reboot, links the drives to a secondary server. PowerSwitch/NT doesn't perform load balancing.

PowerSwitch/NT is somewhat sensitive about the server hardware it supports. It conflicts with certain video hardware and requires the secondary server to have the same video card, network card and SCSI interface as the primary.

Unlike the other products we looked at, Veritas' BackUp Exec 7.2 for NT with the Shared Storage Option and Replication Exec 1.5 takes a data-centric rather than process-centric view of clustering. It monitors and manages the health of shared disks instead of whole servers. Like PowerSwitch/NT, the Veritas software excelled at managing shared disks among several servers, ensuring data preservation in the event of server failure. However, Backup Exec for NT with Shared Storage Option, along with Replication Exec 1.5, doesn't automatically respond to server failures. When we powered off a server in the midst of a series of disk write operations, Veritas' software didn't recover automatically; it required that an administrator restart the application and re-establish the connections after restoring the damaged files. To its credit, Backup Exec made quick work of restoring files.

### Administration and failback

While fast failover was our primary concern, easy administration is always a plus. We found Co-StandbyServer's management console intuitive and easy to use. The console software displays the status of the resources within the cluster as well as the level of traffic among the clustered machines. We liked the ability to configure the rate at which Co-StandbyServer sent watchdog packets between servers to look for failures.

Establishing or reconfiguring a cluster is as simple

## Net Results

**Co-StandbyServer 4.1**
Vinca Corp.
(888) 808-4622, (801) 223-3100
www.vinca.com/products/nt/nt_cosbs.html
$5,499

**Pros**
- ▲ Seamless failover and failback
- ▲ Easy administration

**Cons**
- ▼ Clustered computers must be in the same domain and must have at least three hard disks

**FullTime Cluster 4.3**
Legato Systems
(650) 812-6000
www.fullsw.com/java/solutions/cluster.html
$6,000 to $72,000

**Pros**
- ▲ Excellent failover and failback

**Cons**
- ▼ Didn't mirror dynamic registry updates

**Windows Load Balancing Service**
Microsoft
(425) 882-8080
www.microsoft.com/NTServer/ntserverenterprise/exec/feature/WLBS/WlbsFeat.asp
Included with Windows NT Server 4.0 Enterprise Edition ($3,999)

**Pros**
- ▲ Produced a highly reliable Web server environment
- ▲ Good failover and failback

**Cons**
- ▼ Doesn't replicate data across clustered servers

**PowerSwitch/NT 4.0**
ACON
(503) 639-6700
www.apcon.com/hasolutions.html
$3,140 to $4,760

**Pros**
- ▲ Excellent data preservation at failover

**Cons**
- ▼ Failover requires a reboot
- ▼ Sensitive about the server video card and other server hardware

**Backup Exec 7.2, Shared Storage Option, Replication Exec 1.5**
Veritas Software
(800) 327-2232
www.veritas.com/products/bent/index.html
$4,999

**Pros**
- ▲ Good shared-disk administration

**Cons**
- ▼ No load balancing
- ▼ No server health awareness

as dragging and dropping server icons into place. Moreover, rejoining a repaired server to the cluster is completely automatic. Adding specific support for an application such as Microsoft Exchange was painless, involving only the installation on the cluster's servers of a Vinca-supplied script. The user manual is clear, well-organized and to-the-point.

We also liked Co-StandbyServer's Service Monitor feature, which automatically detects stopped services. Service Monitor can optionally attempt to restart a stopped service and thus avoid full server failover altogether.

Legato's FullTime Cluster's management console provides myriad ways to configure clusters, which Legato refers to as resource groups. Its object-oriented user interface shows a cluster's status and current configuration, and the management console can run on a remote client computer that's not part of the cluster's domain. Returning a repaired server to the cluster is automatic and quick. Like Co-StandbyServer, FullTime Cluster let us tune the rate at which it detected the presence of healthy servers in the cluster. The product documentation is verbose in places but easy-to-follow.

Microsoft's simple, unadorned WLBS setup dialog boxes let you designate both server and cluster IP addresses, set priorities and perform other configuration tasks. Each individual WLBS server has a machine name and IP address, and each WLBS cluster has its own separate Internet name and IP address. Client computers connect to the individual servers via the WLBS cluster's Internet name and address. The WLBS documentation consists of online help files that are not as comprehensive as they should be.

Apcon's PowerSwitch/NT Administrator console shows the status of each server as well as Apcon's SCSI switch. Configuration is a drag-and-drop affair for both the switch and the servers in the cluster. The software inserts entries in the Windows NT event log and, unlike the other products, can automatically send e-mail, issue SNMP alerts or page a technician when failures occur. It also executes batch file programs you can modify to customize the product's behavior during failover. Apcon's documentation, which includes instructions on installing and rearranging adapter cards in the servers, is geared for a more technical audience than the other products' user guides.

Veritas' Backup Exec with Shared Storage Option works with Replication Exec to focus on the preservation of data in a shared disk environment and completely avoid the issues of server failover and failback. Because navigating the list of backed-up files was unintuitive, we found the user interface confusing. Moreover, the product documentation is too general, especially in the area of configuring Replication Exec.

### Little extra network traffic

You don't want to ensure high availability at the expense of ongoing performance problems. In our tests, PowerSwitch/NT and the Veritas components had the least effect on our application and network performance, producing no noticeable application response time problems or network bandwidth utilization. In fact, PowerSwitch/NT doesn't use the network at all, working instead through SCSI cables connected to the Apcon SCSI switch. For its part, Veritas' Shared Storage Option managed an external cabinet of disk drives via Fibre Channel and did not affect our Fast Ethernet LAN.

WLBS used our network frugally but only because it cannot replicate data across our servers. WLBS' only use of the network consisted of watchdog packets and the distribution of client requests among the cluster.

Co-StandbyServer and FullTime Cluster added some extra network traffic in heavy file-update conditions, thanks to a large volume of data mirroring activity among the clustered servers. Both were also a bit "chatty" when we monitored them with a Network Associates Sniffer protocol analyzer. Specifically, Co-StandbyServer added less than 2% to network utilization during normal use (no failover in progress and light to medium file update activity), but utilization increased to more than 5% in heavy file-update conditions. FullTime Cluster's utilization was also normally less than 2%, but network utilization went up to about 6% as its clustered servers mirrored heavy file updates across a group of servers.

Co-StandbyServer, FullTime Cluster and WLBS can be configured to use a separate Ethernet network interface to monitor the presence of healthy servers. All the vendors recommend using the separate interface, and Vinca supplies a network cable with Co-StandbyServer just for the separate interconnect. Co-StandbyServer and FullTime Cluster also use the separate interface for data mirroring.

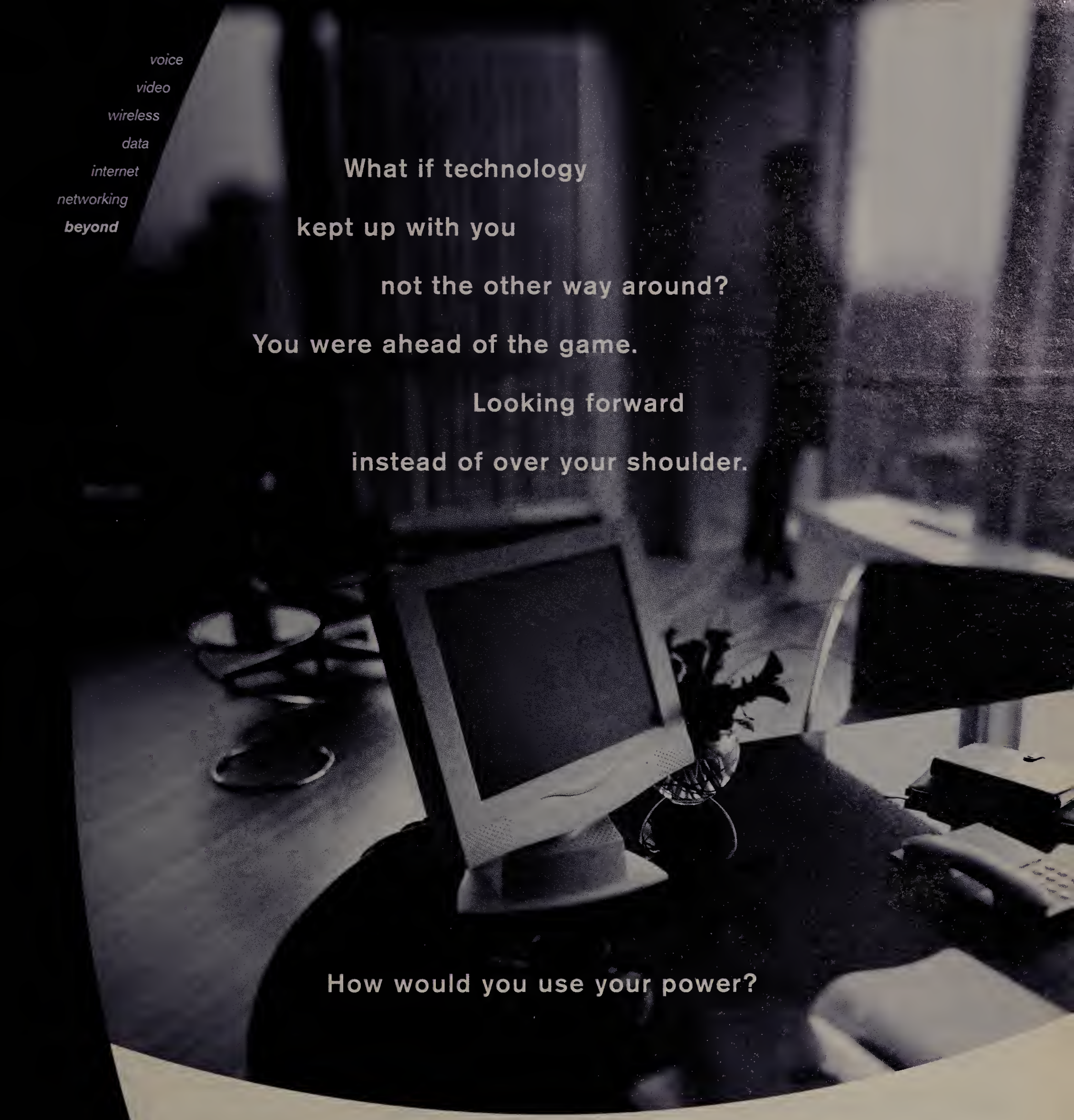
All these products can dramatically reduce server downtime. They can make NT's foibles — the blue screen of death, its allergic reaction to hardware failures and poor handling of low disk space conditions — a private war between you and the operating system. The best of them, Vinca's Co-StandbyServer, can make server failovers completely transparent to people who depend heavily on server availability. Users may never need to know about operating system and server hardware failures again.

*Nance, a computer analyst and consultant for 28 years, is the author of* Introduction to Networking, 4th Edition *and* Client/Server LAN Programming. *You can reach him at barryn@erols.com.*

## How we did it

We installed each clustering product on several server configurations. The simplest configuration involved two servers, while the most complex tied five together. Our test environment consisted of three Compaq ProLiant 5500 computers; two Gateway NS-8000 computers; two Gateway NS-7000 computers; and a shared RAID box. All the computers ran Windows NT Server 4.0 with Service Pack 3. Running in our test environment was a Web site based on Internet Information Server, with forms-based HTML, some ASP scripts and a small Visual Basic program. We also tested each product with Microsoft Exchange, SQL Server, Netscape SuiteSpot, Oracle and Lotus Notes.

Our tests subjected each group of servers to extremely high workloads. In each test, we deliberately failed one server in a cluster and observed the results, then did the same with multiple servers. We also failed individual server components, reduced servers to zero free disk space, disrupted network communications to specific servers and took other actions to simulate conditions that would cause servers to experience a period of downtime. We looked for quick detection of failures and seamless, uninterrupted failover of business application operations. We also checked for the ability to return a failed component to the cluster without downtime, easy administration and each product's impact on performance.

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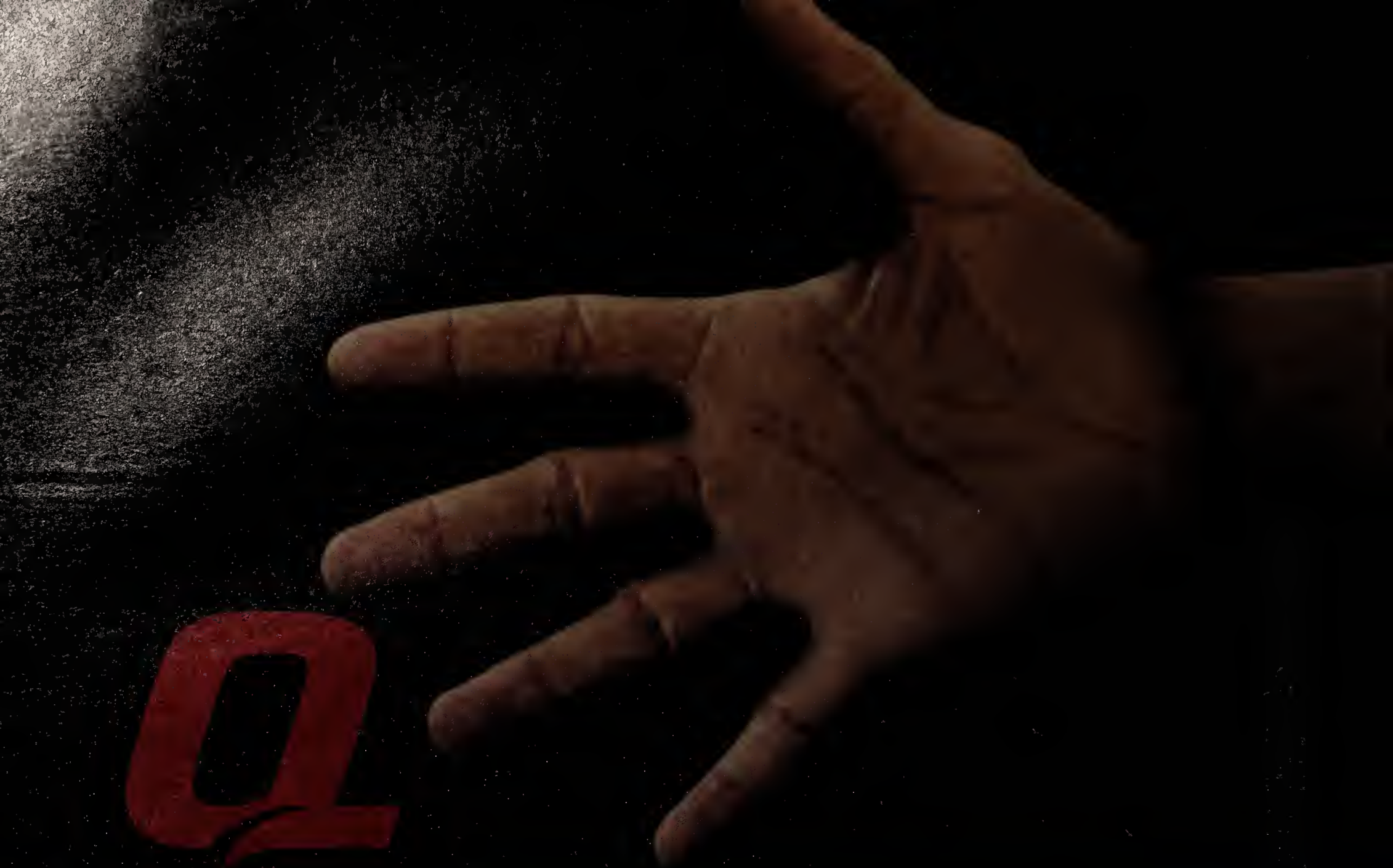

Is a space-optimized server that requires more than these five tools truly optimized?

It's not surprising that the interior of the Compaq ProLiant 6400R is entirely tool-free. After all, like every ProLiant server, it's been designed with customer input from the very start. With maximum 4-way computing power in just 4U, and comprehensive reliability features for maximum uptime, the ProLiant 6400R is just what you've come to expect from the leader in rack servers. And with handy features like top and side access panels, a unique cable management arm and simple slide-out rails, it's exactly what your data center needs. Let the unsurpassed server experience embodied in our ProLiant 6400R give you a hand in solving your business IT problems. www.compaq.com/hand

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Review

# COMMON GROUND FOR WINDOWS AND UNIX

**Hummingbird's NFS Maestro Gateway tops NFS gateway field.**

BY TERÉ PARNELL, NETWORK WORLD TEST ALLIANCE

When you need to share data files between Windows and Unix platforms, you can turn to Network File System (NFS). With NFS, any client can access remote network resources as if they were in the client's native format.

You can host NFS files on any NetWare or Windows NT server, but NFS server software and the data traffic attendant to it can put a heavy load on your network servers. An alternative to weighing down your general-purpose network servers is to install a specialized NFS server. But if you choose to use one of these expensive behemoths, you take on the labor-intensive task of having to load, configure and maintain corresponding NFS client software on every client that must use it.

Luckily, there is a better way — the NFS gateway. These applications manage resource access between Windows clients and NFS servers. By handling NFS connectivity from a central platform, an NFS gateway obviates installing NFS software on each client.

**Product: NFS Maestro Gateway 6.1.1**

**Vendor: Hummingbird Communications**

**For making the most of Network Integration Service and offering cutting-edge support for WebNFS, NFS Maestro wins our Blue Ribbon Award.**

We compared NFS gateways that run on Windows NT Server to evaluate their relative features and benefits. We lined up products that would not require modifications to existing clients or application software, but would allow clients to perform all tasks in the native client environment.

The products we examined were Hummingbird Communications' NFS Maestro Gateway 6.1.1, NetManage's InterDrive Gateway 5.0, WRQ's Reflection NFS Gateway and Xlink Technology's Omni-NFS Dual Gateway software.

Overall, our comparison contained no slouches. We were pleased with the performance and manageability of all the participants. Each product provided necessary NFS resource access with good performance. And even though all the NFS gateways scaled from a few dozen to thousands of users, Hummingbird's NFS Maestro Gateway scored more points in this area because it scales with the most ease and flexibility.

Thanks to its scalability, many useful management features and thorough support for Network Information Service (NIS) for tracking Unix-based resources, we gave the Network World Blue Ribbon Award to Hummingbird's NFS Maestro Gateway. However, it is important to note that Hummingbird's product is by far the most expensive package for a 100-user license.

## Manageability

If an NFS gateway doesn't streamline management, why have it?

Therefore, we weren't surprised when all our entries scored well in this category. They all support the latest version of NFS. NFS Version 3 includes far more management features than previous versions. Each product allowed all clients to be managed from a single console. They also enabled printer sharing between the two operating environments, file and directory browsing, and individual user mapping. All let network administrators define more than one set of access rights for NFS resources, making it easy to restrict access to resources by different types of clients.

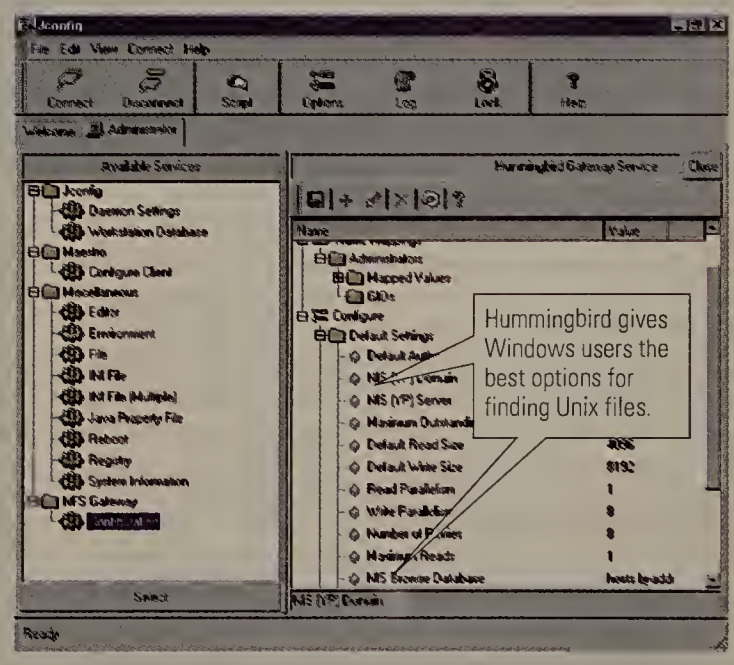
But just as important as what the products do is what they don't do: None required the installation of special software on the clients.

In one important management area, however, one product did fall short. NFS gateways from Hummingbird, NetManage and WRQ let you configure and manage multiple gateways from a single console using their remote administration tools. Disappointingly, Xlink's Omni-NFS Dual Gateway lacks a remote administration feature.

As for installation and use, all installed quite easily and employed the familiar Windows interface. However, we have one complaint: NetManage's InterDrive Gateway 5.0 had practically no paper documentation; we like the ready availability of a printed manual.

### Getting to Unix files through Windows

**All the products we reviewed use the familiar Windows interface — as pictured here with Hummingbird NFS Maestro Gateway — to provide central administration for NFS clients.**




## NOS integration

We expected the basics in terms of network operating system (NOS) integration. TCP support and NFS file browsing were the bare minimum requirements that we placed on each participant. We got this basic level of support from all the products.

Beyond that, we thought the key to easy and elegant integration with NOSes was support for NIS, a distributed database that lists available resources within NFS. Network managers use NIS to define the NFS resources available to each user. To effectively use all the NFS resources available to a given user, the

| Blue Ribbon ScoreCard | Manageability 40% | NOS integration 20% | Scalability 20% | Performance 10% | Security 10% | Total score |
|---|---|---|---|---|---|---|
| NFS Maestro Gateway 6.1.1 | 9 x .40 = 3.60 | 9 x .20 = 1.80 | 9 x .20 = 1.80 | 8 x .10 = 0.80 | 9 x .10 = 0.90 | 8.90 |
| InterDrive Gateway 5.0 | 9 x .40 = 3.60 | 8 x .20 = 1.60 | 8 x .20 = 1.60 | 8 x .10 = 0.80 | 9 x .10 = 0.90 | 8.50 |
| Reflections NFS Gateway | 9 x .40 = 3.60 | 8 x .20 = 1.60 | 7 x .20 = 1.40 | 8 x .10 = 0.80 | 9 x .10 = 0.90 | 8.30 |
| Omni-NFS Dual Gateway | 7 x .40 = 2.80 | 8 x .20 = 1.60 | 7 x .20 = 1.40 | 7 x .10 = 0.70 | 8 x .10 = 0.80 | 7.30 |

**Individual category scores** are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

gateway must fully support NIS.

Microsoft Windows offers name resolution via Domain Name System (DNS) or Windows Internet Name Service (WINS), but not through NIS. This means that if your network doesn't support DNS or WINS, your Windows clients won't have automatic access to NFS resources without NIS.

Without NIS support in the gateway product, you would have to define the resources manually for each client or install additional client software.

Hummingbird's NFS Maestro Gateway had an advantage in the area of NIS support. Its software supports client browsing of NIS maps, automated drive mapping and more. In other words, it lets Windows clients browse and access NFS resources as easily as Unix clients.

Also worthy of note in the NIS support category was NetManage's InterDrive Gateway 5.0, which manages network connections using the familiar Windows control panel, Windows Explorer, Network Neighborhood or even an old-fashioned MS-DOS window.

While NOS integration begins with NIS support, it doesn't end with it. Flexibility is also important. For example, if the gateway is restricted to one-way access, only Windows clients can access Unix resources, but not vice versa. Xlink's Omni-NFS Dual Gateway stood out because it is bidirectional, which allows Windows and Unix clients to have access to files across NT and Unix servers.

## Net Results

**NFS Maestro Gateway 6.1.1**
Hummingbird Communications
(416) 496-2200
www.hummingbird.com/products/nc/nfs/index.html
$11,600 per 100 users

**Pros**
- ▲ Excellent NIS integration
- ▲ Supports WebNFS protocol

**Con**
- ▼ Highest price of all participants

**InterDrive Gateway 5.0**
NetManage
(408) 973-7171
www.netmanage.com/products/
$9,000 per 100 users

**Pros**
- ▲ Excellent autotuning features
- ▲ Strong security

**Cons**
- ▼ Extremely little paper documentation
- ▼ Lacks WebNFS support

**Reflection NFS Gateway**
WRQ
(800) 872-2829
www.wrq.com/products/nginfo.html
$7,200 per 100 users

**Pro**
- ▲ Excellent autotuning features

**Con**
- ▼ Lacks WebNFS support

**Omni-NFS Dual Gateway**
Xlink Technology
(408) 263-8201
www.xlink.com/nfs_products/Omni-NFS_Dual_Gateway/
$6,500 per 100 users

**Pros**
- ▲ Bidirectional, allowing Windows and Unix clients access to files on both NT and Unix servers
- ▲ Low price

**Cons**
- ▼ No remote management administration feature
- ▼ Lacks WebNFS support

### Scalability

For an NFS gateway product, scalability on the server side means being able to accommodate a growing number of clients. With their centralized management and gateway server-based design, all the participants in this comparison are pretty scalable from a server perspective. However, scalability on the client side means allowing a client to establish and maintain many connections to a growing number of Unix resources. This can be tricky because only 26 drive letters are available to any Windows NFS client.

Xlink's Omni-NFS Dual Gateway accommodates client scalability by allowing one drive to retain multiple drive letters that can each have different access rights. Hummingbird's NFS Maestro Gateway implements deviceless connections, allowing clients to connect to NFS file systems without reserving a drive letter for that connection. This worked smoothly during our testing and freed device letters for other types of connections. What's more, NFS Maestro Gateway is the only product in our sample that supports the WebNFS protocol for Web-based resource access and sharing.

The other companies plan to add WebNFS support to their products in the near future.

### Performance

Performance was fairly equal among the products we tested. The greatest variation in task completion time across various platforms was less than 7%.

In addition to raw throughput measurements, we looked at a couple of gateway design elements that affect performance and may give certain products an advantage in large, complex and very busy networks. The first design element was client architecture. By its very nature, NFS gateway software can't allow the direct, rapid access to NFS resources that a well-tuned piece of NFS client software can.

Just for fun, we compared the performance of NFS gateway systems with that of NFS clients working directly with NFS servers. We used Hummingbird's Maestro NFS Gateway Client software. As you can imagine, Hummingbird's multithreaded 32-bit client running at Ring 0 was faster at file access than any of the NFS products — even Hummingbird's NFS Maestro Gateway. However, performance of the client wasn't so great that it justified the additional complexity and management headaches of loading NFS client software on each desktop.

The second design element we considered was automatic performance tuning of the NFS gateway to optimize throughput at times of peak usage. NetManage's InterDrive Gateway 5.0 has the most impressive autotuning feature; it optimizes throughput not only for each host, but also for each connection. The autotuning features of WRQ's Reflection NFS Gateway came in a very close second.

### Security

If an NFS gateway product enforces consistent file permissions, it can use the security features of the NOS environment in which it operates. NIS plays an important role in ensuring that the group ID numbers and user ID numbers that Unix employs to identify files remain synchronized among the hosts and NFS gateway. In short, strong NIS support ensures that user access permissions to a file don't change as the file is saved from host to host.

All the participants handled file permissions adequately, though Hummingbird's NFS Maestro Gateway, the product with the most thorough NIS support, scored the best in this category. However, NetManage's InterDrive Gateway 5.0 was equally impressive for its similar use of Microsoft security on the Windows side, along with NIS and PC-based NFS authentication routines on the NFS server side. This means that authentication takes place at the Windows client and again at the NFS server.

When we looked at each product as a whole, we realized we would recommend any of them depending upon the environment in which they would operate. Xlink's Omni-NFS Dual Gateway, with its bidirectional client support, is a great choice for networks with Unix clients trying to access NT resources and vice versa. Because it was easy to deploy and had good client-side security, we liked NetManage's InterDrive Gateway 5.0 for smaller networks with exclusively Windows clients. WRQ's Reflection NFS Gateway was fast and scalable, making it good for large networks. But in terms of performance, manageability, scalability and ease of use, the overall winner for networks of all sizes was Hummingbird's NFS Maestro Gateway.

## How we did it

We tested how thoroughly and easily the products enabled resource sharing among Unix and Windows clients, as well as how they let us manage Unix and Windows clients. We set up a test network consisting of an Network File System (NFS) server, two Windows NT 4.0 servers, three Unix clients, three Windows NT Workstation clients and three Windows 95/98 clients. We used four types of NFS export mappings: temporary shared, temporary not shared, persistent shared and persistent not shared. We mapped individual Windows users' identities to NFS accounts and then passed the mappings through the gateway.

After installing each NFS gateway, we evaluated the management feature set based on thoroughness and ease of installation and use. We then tested client accessibility and performance by browsing, opening and printing identical files.

*Parnell is a telecommunications consultant and author with more than 18 years of experience in the telecom and data network industries. She has written many articles, columns and product reviews, and is the author of four books on telecommunications, telephony and data networking. She can be reached at RedReviews@aol.com.*

# Management Strategies

***Career Development, Project Management, Business Justification***

# Put it in writing

***Giving your network staff detailed job descriptions can help staunch turnover.***

BY MEL MANDELL

Are job descriptions simply documents that are placed in personnel folders and then forgotten, or do they really pay off?

According to one expert on personnel matters and a variety of network and IT managers, job descriptions are well worth the effort to create and, just as important, update regularly.

In today's tight labor market, use of job descriptions can lead to less turnover, says consultant Jeff Schippmann, director of strategic performance modeling at Personnel Decisions, a global human resources consultancy in Minneapolis.

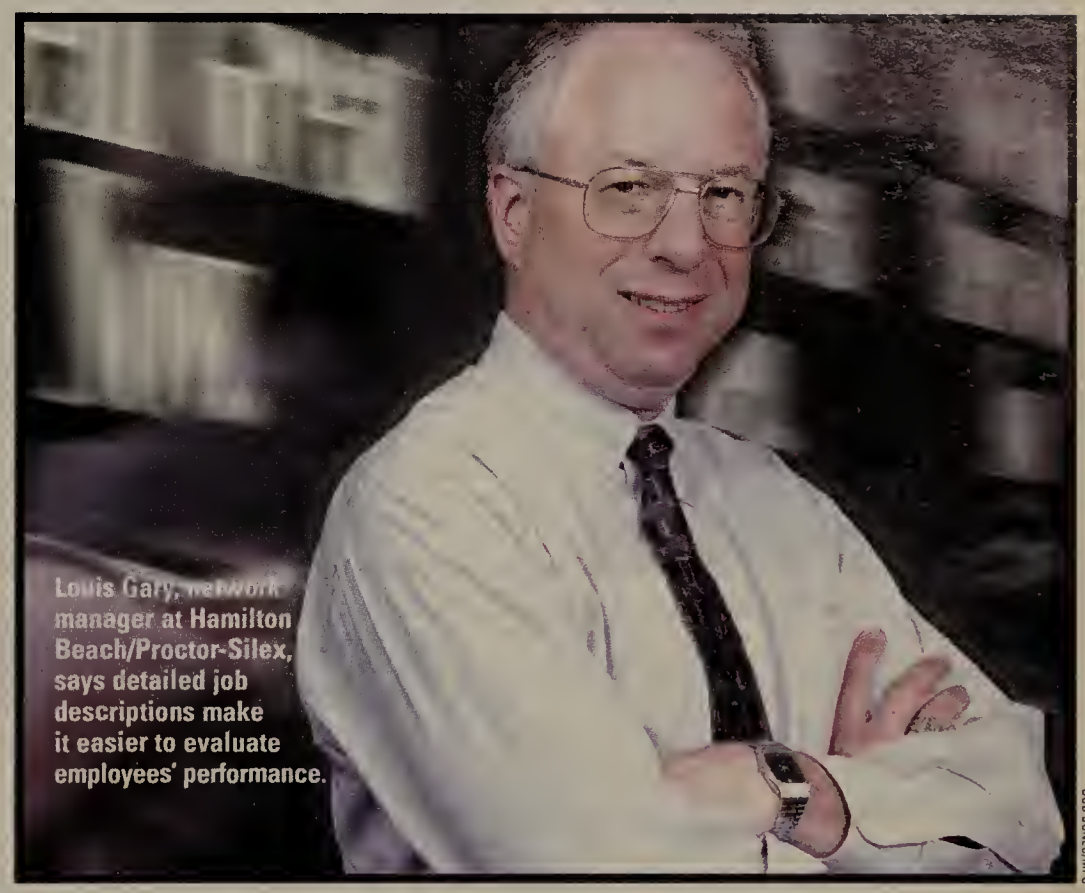
Schippmann recommends beginning all interviews by handing applicants a description of the position in question. At this point, applicants can express interest or state that they're overqualified or underqualified for the job. Result: lower possibility of hiring someone that won't work out.

Larry Whitehead agrees. He's the director of IT for international carrier Primus Telecommunications Group in McLean, Va. Whitehead not only offers descriptions during interviews, but also posts them on the company's Web site under "Employment Opportunities" — a good move now that more and more jobseekers are looking for positions via the Web.

Richard Swan, IT manager for Revere Copper Products in Rome, N.Y., hedges on the value of job descriptions. Swan doesn't offer job descriptions during interviews (but will provide them if requested) because "if an applicant is overqualified, I don't want to inhibit his or her acceptance; I may hire the applicant in the hopes of giving him or her greater responsibilities than originally conceived," he says.

Louis Gary, network manager at Hamilton Beach/Proctor-Silex in Glen Allen, Va., believes job descriptions for all jobs, including his, should be available to staffers. That way ambitious people can find out what's necessary to advance.

Helping to set fair compensation levels is another potential benefit of the job description practice, says Lauris Ann Nance, chief information officer of the Public Service Company of North Carolina, a natural gas distributor in Gastonia. She determines salary levels by comparing her staff's job descriptions with those provided by cooperative counterparts in other companies. The same procedure is followed at 3M in St. Paul, Minn., according to a spokeswoman.



Louis Gary, network manager at Hamilton Beach/Proctor-Silex, says detailed job descriptions make it easier to evaluate employees' performance.

BOB JONES/MPG

Nance says that job descriptions should be no longer than one page and should be written with active verbs to emphasize the growing mission of her department. She says no one has ever complained about being asked to write or update job descriptions for their employees.

Other managers interviewed mostly agree with the one-page limit, although Swan admits he has difficulty keeping all of them to one page and writing them in general. Sometimes he spends as much as half a day writing just one.

To make it easier, Hamilton Beach's Gary employs templates to get the descriptions down on paper and has employees help keep them updated.

Job descriptions also help in evaluating performance, Gary adds. They confirm how well IT staffers fulfill what's expected of them according to their individual descriptions.

Although Revere Copper's Swan believes job descriptions can help employees prioritize activities, he points out some disadvantages. One problem is they can be viewed as "constraining and not completely consistent with the team environment we're trying to stimulate," he says.

Personnel Decisions' Schippmann warns about another possible downside: poorly constructed documents might be used as evidence in discrimination lawsuits. Review your current job descriptions with that in mind, and update them as necessary to remove any language that may imply restrictive hiring practices.

It's no surprise that HR managers are often involved in the creation of job descriptions, especially if they are used across the company, not just in IT. That's the situation at 3M. There, the descriptions are primarily written by compensation people, with some input, of course, from the managers involved.

In large companies, however, the descriptions are often updated by individual departments and the central listings become outdated.

How often should job descriptions be updated? In fields such as IT and network operations, where the technology and the jobs are changing so rapidly, some managers find they have to do updates twice per year. Whitehead would like to update quarterly but admits that updates are less frequent.

Nance says that because so many of the 75 people in her busy department are being given added responsibilities, updating job descriptions to reflect these expanded jobs is a considerable effort. As a result, descriptions for other staffers are only updated annually.

If you haven't looked at your department's job descriptions lately, you may be overlooking an important tool, particularly in this tight job market.

*Mandell is a freelance writer in New York. He can be reached at melmandell@aol.com.*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## Integration Engineer

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## Systems Architect

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## Tier III Technical Engineers

Requires 3-5 years WAN maintenance & implementation experience; CSU/DSU familiarity; a BS degree; and extensive experience with IOS configuration & upgrade; Cisco/Cabletron/Bay Networks, and IP routing on Cisco products (in a X.25 switched network).

## Tier II Technical Engineers

Requires 2+ years LAN/WAN experience; a BS degree; 1 year experience IP routing on Cisco products; and experience with IOS configuration & upgrade and Cisco/Cabletron/Bay Networks. A UNIX background is a plus. Knowledge of HP Openview and Network Node Manger is beneficial.

## Tier II/III Voice Engineers

Requires the ability to manage multiple vendors, maintenance contracts, billing and escalations in a reactive environment. Strong organizational and escalation skills are required to coordinate with AT&T Network Management Centers in support of AT&T client global transport network (VTNS, 800 service). Knowledge of network services must be complimented with an in-depth understanding of PBX Move, Add and Change (MAC), PBX features, manual ring down circuits, T1, private lines over IDNX, & CSU/DSUs. Understanding of Lucent Technologies (Definity) router (3Com, Cabletron, Optivity, Nortel, Octel) an added plus.

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Position requires an Analyst with systems administration skills. Responsibilities will include administration & day-to-day duties involving:

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SOFTWARE TEST ENG. (multiple openings). Duties include overseeing function specs in BSCS software requirements in design change requests, high level designs functional specs, design & execute test plans for problem solving, document test defects, & prov. progress reports to mgmt, to include assignment completion estimates; support R&D dept. re: testing specs. Requires use of Unix, Oracle, Windows, SQL, PL/SQL, C, TCP/IP & HP platforms.

SOFTWARE ENG., Custom Product Development: (multiple openings). Duties include creating functional spec documents based on design request & High Level Design for customer prod dev.; implement design, perform unit testing of developed code & resolve defects; prov. support to System Testing teams & guidance to team members re: to state-of-the-art techniques. Requires use of C, Unix, OO, TCP/IP, Windows, SQL & HP platforms.

SOFTWARE ENG.: prov. product info. support to clients in the U.S. & Latin America; determine software/hardware related problems, implement solutions to resolve problems, implement solutions to resolve problems, support software dev. issues; provide tech support to Project Analysis, & software expertise & guidance through code analysis to determine configuration related problems. Requires use of Unix, Oracle, C, Windows, SQL & TCP/IP, & ability to read, write & speak Portuguese or Spanish languages.

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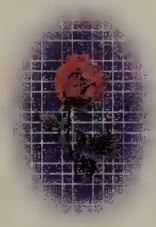

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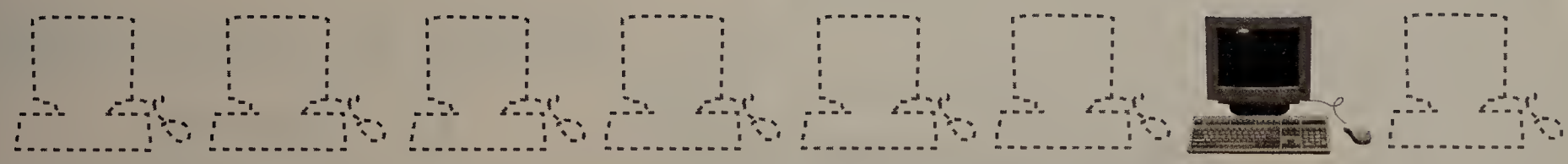

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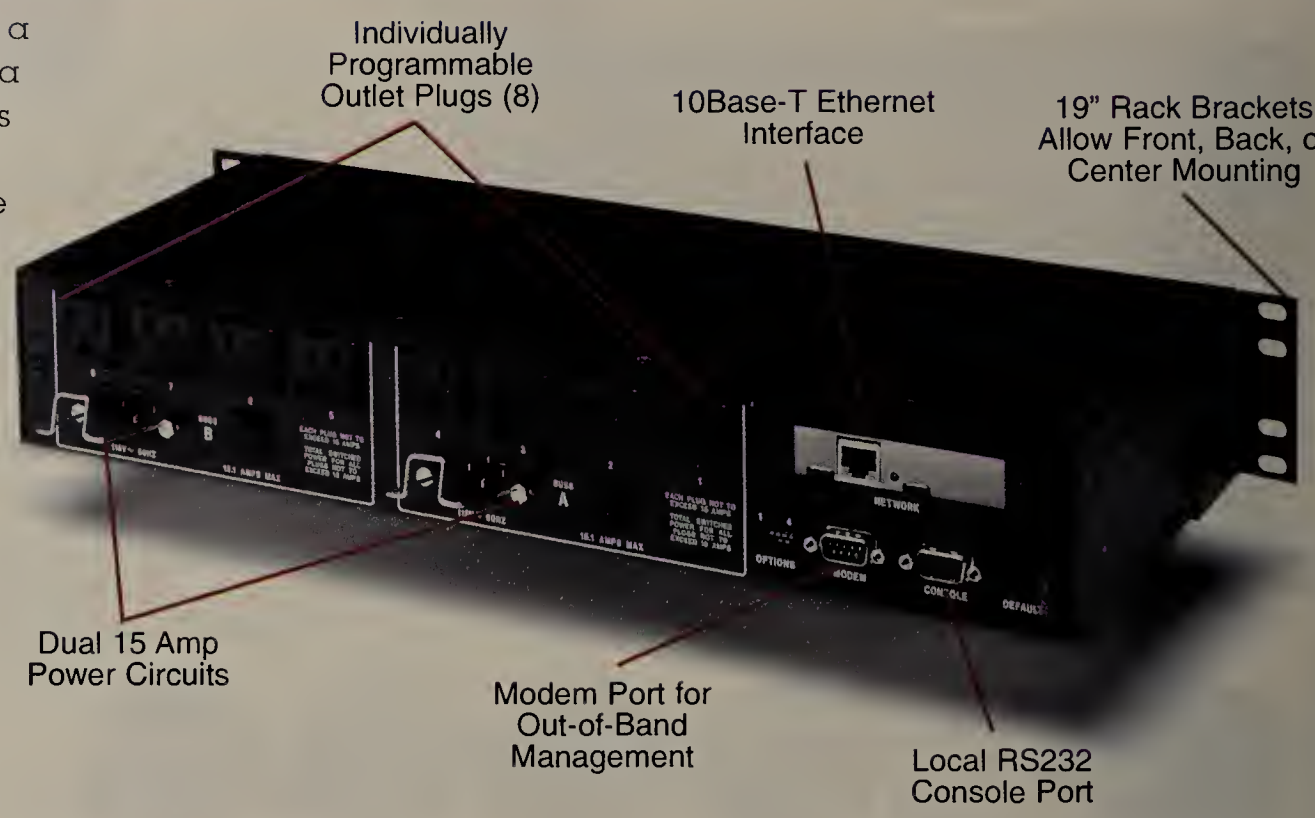


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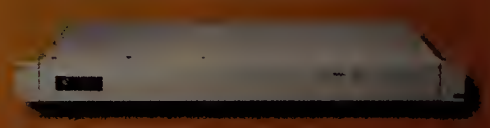

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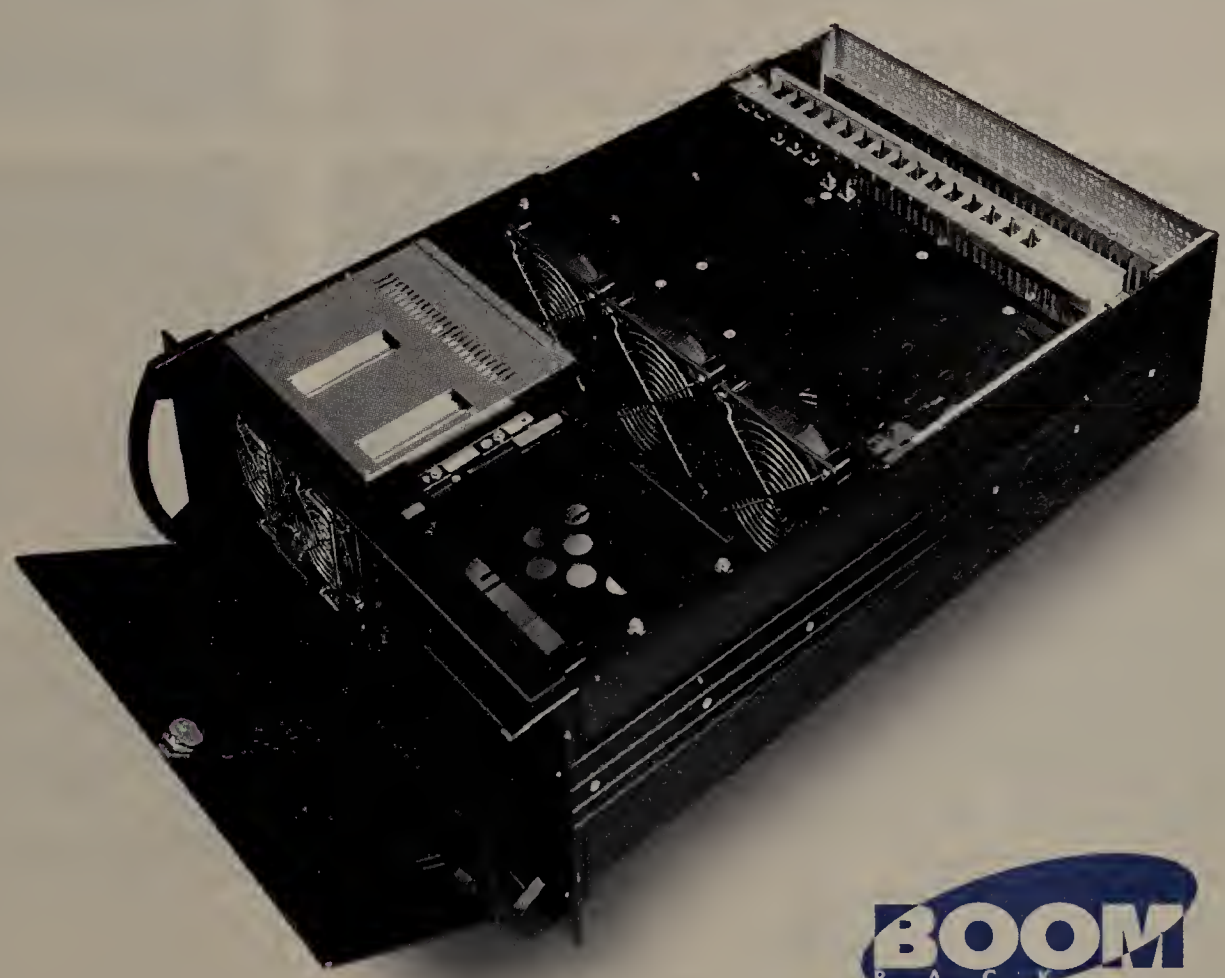

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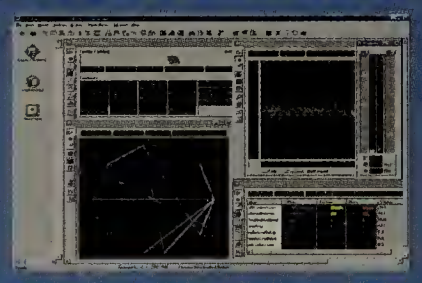

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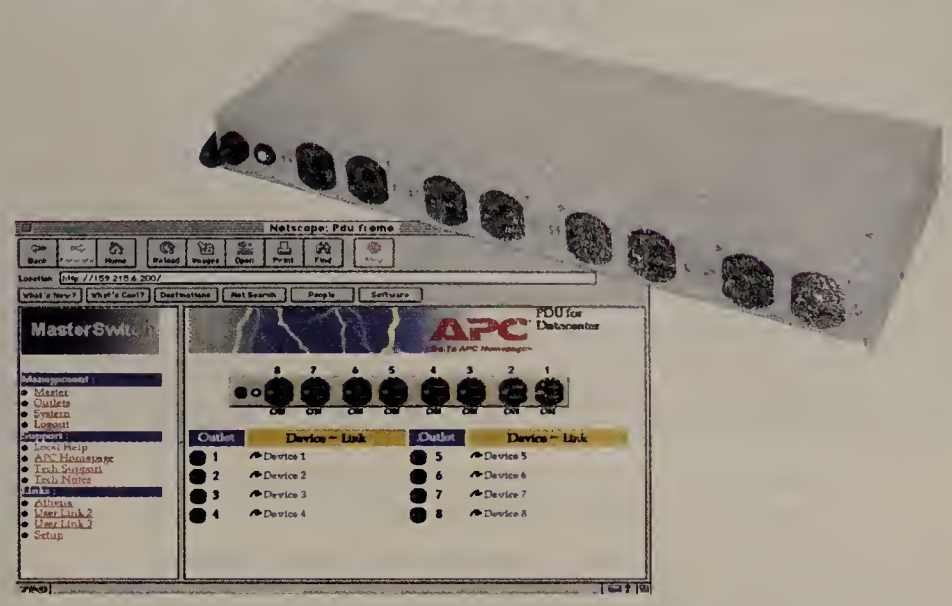


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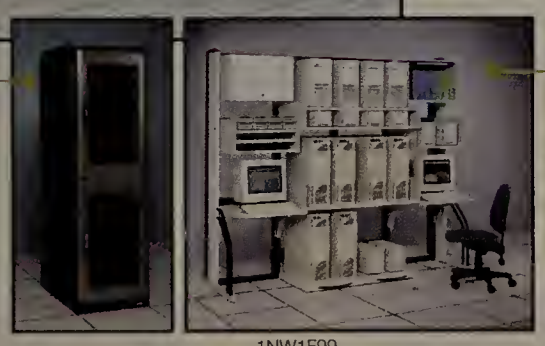

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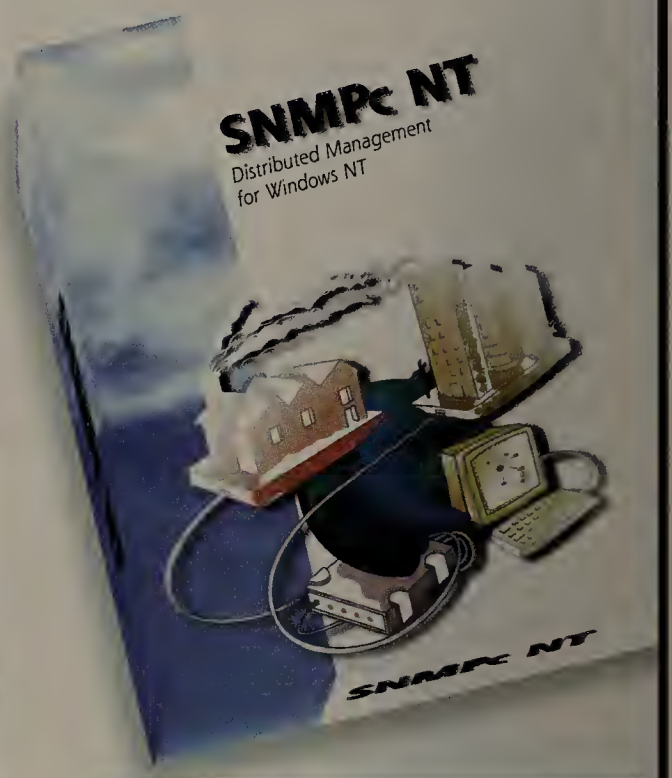


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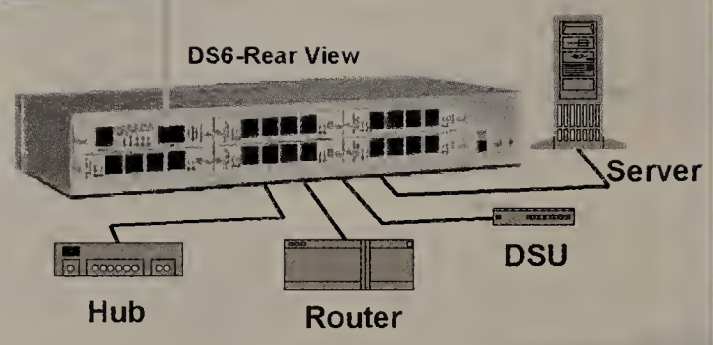


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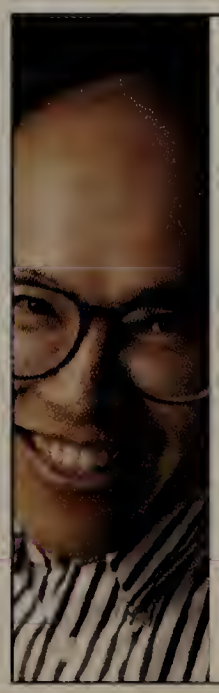
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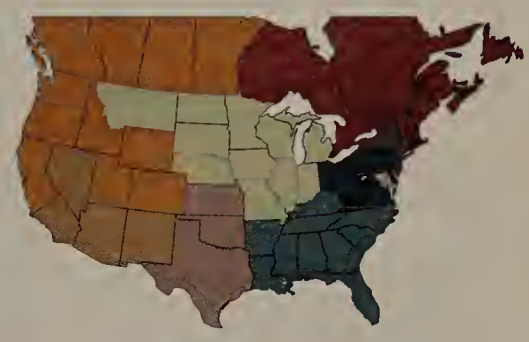

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**Lucent,**
continued from page 1

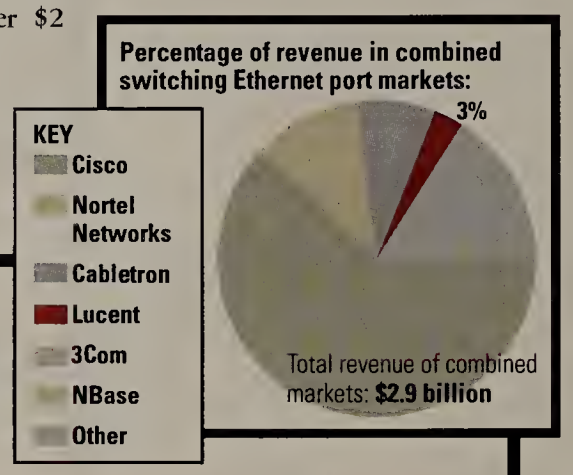
Lucent's variety of new voice/data products, such as unified messaging and IP telephony offerings, will deepen its role in corporate networks.

Yet Lucent officials say the company won't buy leading enterprise data-network companies just to achieve market share, even though that's precisely what Lucent has done in the service provider data market.

Enterprise users say Lucent's oft-stated strategy of approaching its PBX user base to sell data equipment has not translated into a whole lot of sales calls. Instead, they say Lucent seems more interested in selling service contracts to install which data network vendors to use — and that's usually not Lucent. "They say, 'I'm pretty sure it's going to come from these two or three [other] guys,' " Akers says. But then they need help designing the network and deploying it across thousands of locations nationally and internationally. "And that's what we do for enterprise customers," he says.

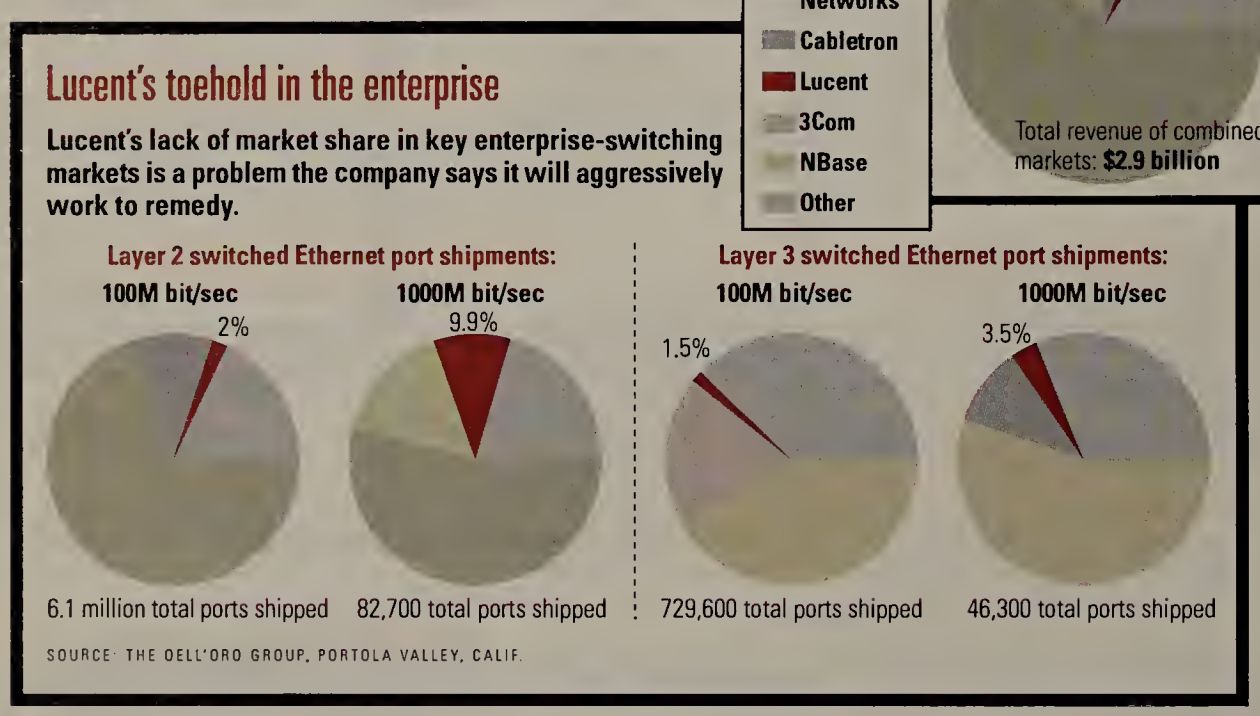
### Where are the resellers?

Technically, Lucent already has an enormous enterprise business, with its Business Communications Systems division logging just under $2 billion in sales in the first quarter, compared to $5.1 billion for service-provider sales.




## Lucent's toehold in the enterprise

**Lucent's lack of market share in key enterprise-switching markets is a problem the company says it will aggressively work to remedy.**




SOURCE: THE DELL'ORO GROUP, PORTOLA VALLEY, CALIF.

and manage networks — often using its competitors' products — through its NetCare professional services division.

*Network World* has learned that Lucent Chief Operating Officer Dan Stanzione was challenged a week ago during a meeting with Lucent employees to explain why the company continues to lag far behind competitors in enterprise equipment sales. He was reported to have responded that Lucent "needs to do more with the enterprise."

And NetCare Division President Jeff Akers — another Lucent star — makes no bones that his mission is to sell and support multivendor networks rather than push Lucent boxes.

Akers estimates that 96% of the time that companies come to Lucent NetCare, they have "already made their technology decisions," including

But that revenue is overwhelmingly voice-related, and Lucent's quarterly statements invariably attribute the enterprise growth rate — currently at 15% annually compared to 40% annually for carrier sales — to PBX, call center and related sales with no mention of data-equipment products.

Indeed, for a company whose name is now commonly uttered in network industry circles in the same breath as Cisco and Nortel Networks and often ahead of 3Com and Cabletron, Lucent's enterprise data market share remains amazingly paltry. For Gigabit Ethernet, Lucent has taken almost 10% of the market for Layer 2 switching, but overall, its share of the LAN switching market is still less than 3% (see graphic).

"The strategy has never been to buy market share in the enterprise," says Doug Ruby, product marketing vice president of Lucent's campus switching group. Ruby claims that in recent years, no other new player has achieved the kind of growth that Lucent has in the enterprise.

Company officials claim that in addition to their direct sales force, they have developed an indirect sales group of 150-200 resellers, largely those that were selling products from Lucent's past data product company acquisitions, such as Prominet and LANNET.

But other sources question how much these resellers are really pushing Lucent products. "The fundamental problem they have is that Lucent really doesn't have a sales channel to address the data-networking side of the house," says a prominent former Lucent employee who worked in both voice and data networking and left earlier this year.

Users haven't seen much evidence of such a channel, either. One voice telecom manager from a company that primarily uses Lucent PBXs and Cisco routers says Lucent has merely sent the telecom department literature about the data products and asked the department to direct the material to data-network administrators. That was until the voice and data network managers together decided to ask Lucent for a presentation on convergence after returning from a Cisco convergence presentation.

Lucent's foot-in-the-door strategy may not be enough, says the former employee. "It was always quite a struggle to get the attention of data-networking managers," he says. "Once they had something that worked, it was hard to justify changing it."

Ironically, the data-switching users that Lucent has gained seem delighted with the products. "In terms of performance, this thing has been much better than anyone expected," says Mike Hannigan at Pacific Research & Development, an international insurance company affiliate in Long Island, N.Y., that uses Lucent's Cajun P550 switches.

But Pacific Research obtained the switches through "pure, dumb coincidence" after the company learned of Prominet — the original manufacturer of the P550 — in a phone call about 3Com's competing CoreBuilder product.

### Taking their time

Ruby says Lucent will continue to expand its product line — for example, by selling Ascend's Pipeline access routers directly into the enterprise market — rather than wait for carriers to place the products on customer premises as part of their services.

But Lucent has avoided most low-margin commodity workgroup and desktop product markets. Analysts say that's partly because Lucent has so much investment tied up in Bell Labs and still retains some characteristics of an old-line telecom-equipment house.

"Large corporations are not designed to make widgets or to make low-end LAN devices when what's necessary is to have very high margins to meet the needs of shareholders," says Frank Dzubeck, president of Communications Network Architects in Washington, D.C. Cisco faces a similar challenge but has an advantage because it's moved so heavily to Web-based selling, he adds.

And the former Lucent official says that despite Cisco's purchase of an IP PBX company and other voice initiatives, Lucent feels it will take several years for Cisco to make its presence known in voice, so Lucent feels it can move in a measured way. Ruby agrees, in a way. "This is not a short battle. It's a long, drawn-out war," he says.

Yet Lucent shows no such hesitation on the service provider side of the house. At Lucent's Network Reliability Center outside of Denver, Lucent has built not only a state-of-the-art network operations center but also wines and dines potential carrier clients so frequently that it has hired a full-time French chef to prepare meals. And throughout the Denver area, Lucent's employee base of 7,600 is overwhelmingly concerned with PBX and call center training and support as well as service provider support.

Lucent NetCare does maintain an operations center in the Tampa, Fla., area that specializes in fully managing 160 enterprise data networks — and indeed NetCare actually claims to have helped install or support 10,000 enterprise customers. But much of that business actually comes as a subcontractor to carriers such as MCI WorldCom to provide rollout support for carrier-managed contracts, NetCare's Akers acknowledges.

In the end, the former Lucent official says it's no mystery why top Lucent corporate officials have stressed the service provider opportunity: It was too juicy to pass up. Many carriers were reluctant to buy switches from AT&T when it still owned what is now Lucent, for fear of letting AT&T in on their rollout plans.

"But when Lucent got unbundled from AT&T, the phones were ringing off the hook with regional Bell operating companies and other telephone companies saying they wanted Lucent's products because theirs weren't as good," the former Lucent official says. "And the calls haven't stopped." ◪

**ANALYZING ASCEND**

***Go online for our analysis of Lucent's recently completed Ascend acquisition. www.nwfusion.com DocFinder: 3645***

**3Com,**
continued from page 1

will be in the "high single digits" as 3Com looks to reduce dependency on revenue from mature product lines — network interface cards (NIC), modems and hubs — by more than a third.

Many analysts have subsequently lowered their forecasts for the company and downgraded their investment recommendations (NW, June 28, page 16).

"As we finish fiscal 2000, we will have 50% of our revenue from established growth businesses, 25% from emerging very high-growth businesses and only 25% from classical mature products," Benhamou says.

Some analysts think quarterly growth in the high single digits for fiscal 2000 is still overly optimistic.

"I'm actually forecasting flat growth," says one analyst who requested anonymity. "Maybe they'll get there, maybe they can't. We'll have to see."

### High-growth businesses

Currently, NICs, modems and hubs account for 39% of 3Com's overall revenue, which in fiscal 1999 was $5.8 billion. The emerging high-growth businesses include LAN telephony, and wireless network access via handheld devices, such as 3Com's wildly popular PalmPilot.

Benhamou consistently mentioned Palm and scenarios involving Palm computing in last week's interview, and said sales of the handheld device will account for $1 billion of 3Com's fiscal year 2000 revenue. Benhamou and other 3Com executives generally decline to detail revenue from specific products or product lines.

Yet Benhamou stopped short of designating Palm, or any other product line, as 3Com's showcase offering.

Some analysts have criticized 3Com for being unfocused by not having a foundation product, the way Cisco has with routers.

MICHAEL MUSTACCI & ASSOCIATES

> ***"We don't have a centerpiece. I don't think we should have a centerpiece."***
>
> Eric Benhamou, CEO, 3Com

"We don't have a centerpiece," Benhamou says. "I don't think we should have a centerpiece. We're really focusing on delivering personalized access to information. Multiple products are used to create that personalized information access service. I would like to be known for delivering that service. I would not like to be known for any one of these products."

Benhamou declined to comment on recent speculation that 3Com, or any of its business units, is an acquisition target. 3Com's stock has slipped from the low 50s in December to the mid to high 20s, helping to fuel this speculation.

### Friday rumors

"Interestingly, these rumors tend to occur most frequently on Fridays and during the week before earnings," Benhamou says. "I'm not drawing any inference from this, but statistically this is very clear, very visible."

One business unit that pops up as an acquisition/divestiture candidate is the carrier business unit, which predominantly is made up of the US Robotics business. Notably, this is also the business unit with the mature, declining-growth modem products.

### Strategic fit

Yet Benhamou last week reiterated his stand that the carrier unit is a strategic one for 3Com. Departing again from the previous practice of not discussing revenue by product or business unit, he says carrier products will account for $700 million to $800 million of 3Com's fiscal 2000 revenue.

US Robotics is also the foundation for 3Com's future growth with products that address emerging markets, such as LAN telephony and broadband access.

Acquiring US Robotics "was a very smart move. It is extremely synergistic," Benhamou says. "Because US Robotics, in fact, gave us a way to build up cable modem and [digital subscriber line] expertise. We didn't have any at 3Com. Voice over IP is something that really came about with US Robotics."

"It's very important to understand that today, connectivity has grown into something that's not only delivered to corporations," Benhamou adds, providing his rationale for the US Robotics business and 3Com's changing landscape. "We're increasingly delivering connectivity to small businesses and consumers." ◪

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# EXPERTS LOOK TO THE FUTURE

NetworkWorld Q&A

*Last week 3Com celebrated the opening of its new East Coast operations headquarters in Marlborough, Mass. Attending the festivities were industry luminaries Robert Metcalfe, 3Com founder and inventor of Ethernet; Tim Berners-Lee, father of the World Wide Web; and 3Com CEO Eric Benhamou. They took time out to talk with* Network World *reporters.*

**Looking back 10 years, did you envision the industry to be where it is today?**

**Benhamou:** Most of us felt we were part of something big. But I think what has happened in the 1990s has gone far beyond the expectations of most of us.

**Berners-Lee:** In 1989 in Europe, the Internet was arriving, but most of the physicists were using VAXes with DECnet. At that point, it wasn't clear from preceding history that it would be possible for the world to [converge] with standards the way it did.

**Berners-Lee: Will standardization continue?**

**How do you see things evolving from here — standardization on Ethernet, IP and the Web?**

**Metcalfe:** When you ask, "What's next after IP?" the room seizes up. No one can imagine anything taking the place of IP. That obviously, at some point, is going to change.

**Berners-Lee:** Whenever something becomes ubiquitous, whatever the next version is you call it IP still. For example, the phone system: It's been out there for ages. Nobody said, "What will we call the telephone after we've thrown away the [old] exchanges." They just kept calling it the telephone and service continued and technology developed.

JOHN BOHN

**Metcalfe comments on Ethernet, then and now.**

**Metcalfe:** The Ethernet that Eric [Benhamou] sells today is not what I invented 26 years ago. But we still call it Ethernet.

**Berners-Lee:** The more interesting question is whether this amazing standardization, which has gotten us to where we are and has allowed the Internet to explode, will actually continue, or will it disintegrate? One of the questions is, in 10 years time, will we be dreaming of the nostalgic days when there was just one Ethernet, just one IP, and just one HTML? XML is coming out and it allows anybody to invent a new markup language. There could be 20 billion markup languages out there.

**Do you see another Xerox PARC out there inventing the next Ethernet?**

**Metcalfe:** My own take on that is that the next Xerox PARC will be a university or a bunch of universities because that seems to be the emerging place for investment and research dollars.

# Backspin

# A free way to establish identity

I was talking to someone recently who was complaining about spam and how it is getting worse every day. Now, I have always contended that to control spam there's only one requirement: Establishing the identity of the sender.

To do this requires that messages be signed with digital signatures. Then if a message arrived without a signature, your e-mail client could trash it or otherwise handle it as being "improper."

Digital signatures require a digital certificate that is appended to the message along with a message digest — effectively a checksum of the message contents combined with the digital certificate (see Gearhead, *NW*, Feb. 1, 1999). Digital certificates can be issued by a number of certification authorities, such as Verisign, a pioneer in this technology.

MARK GIBBS

When a message is received, the identity of the originator can be established by referring the attached certificate to the certification authority, which should be a known and reputable organization. The certification authority's reputation is important, as I'm sure you would not accept certificates from unknown authorities, such as The Unknown Certificate Company or Spam 'R Us.

But a useful certificate from a reputable certification authority costs money. Sure, Verisign has been distributing certificates for free, but that doesn't help — the free certificates don't ensure that the certificate's owner can be established. From the point of view of authentication, the freebie certificates are about as much use as presenting your official Dick Tracy Detective Club membership.

Useful certificates start at $9.95 per annum, which is not much. But I think it's a fairly safe bet that the majority of Internet users won't pony up for something that won't have obvious and immediate value to them. When the volume of spam they receive exceeds 50%, then 60%, then 70% of their e-mail, well, they may feel differently.

But even though they will eventually see the need for an effective method of dealing with spam, it will be years before the majority of users feel forced to do something. By that time, the end of useful Internet e-mail will be upon us.

What we need to do is get certification into the market as soon as possible. To have any impact, getting and using digital certificates must be easy to do, and when it comes to appealing to the majority of Internet users, the great motivator is the word "free."

So, I have this idea: Banks and other institutions that know their customers well should give away certificates. They should do so in cooperation with Verisign or some other reputable authority, or even set up their own certificate authority. Because these organizations know their customers, they can realistically and inexpensively establish a customer's identity.

And then these sponsors, along with the Internet Engineering Task Force, the World Wide Web Consortium, the Internet Mail Consortium, Microsoft, IBM, Qualcomm and other groups and vendors with Internet interests, should promote the need to use the certificates.

So, what's in this for whom? To begin with, it would prevent what would otherwise be inevitable — the complete breakdown of Internet mail, so the plan is in everyone's interest.

For the banks and other financial institutions, the win is to create a public infrastructure that supports commerce in general and financial transactions in particular. And vendors such as Microsoft, IBM and Qualcomm become confirmed as market leaders and visionaries and receive a more stable infrastructure in which to sell their products.

So what do you think? Will it work? Will financial institutions and vendors see the opportunity? Can users be encouraged to use digital certificates? What will the problems be? Let me know.

*Are you authentic? Certificates to nwcolumn@gibbs.com.*

# 'NET BUZZ

The latest on the Internet/intranet industry

PAUL MCNAMARA

**Paul Hoffman doesn't always measure** his words carefully. While this can be a fault in many contexts — hostage negotiation and marriage spring to mind — the trait serves Hoffman well in his dual roles as director of the **Internet Mail Consortium (IMC)** and the fledgling **Virtual Private Networks Consortium (VPNC).**

Ask the man a direct question, and he'll give you a juicy quote, not marketing propaganda. Journalists love juicy quotes, which is why Hoffman's name can be found in the address books of so many reporters. The man knows that industry ink is generally good for business at his 30 IMC and 15 VPNC member companies.

You can bet press attention will be one byproduct of Hoffman's latest plan for his consortia: publicly posted interoperability charts spelling out in naked detail how the members' products work with each other and — more to the point — how they don't. The VPNC version should be particularly noteworthy, given the explosive growth of that market and vigor with which VPN vendors are competing. On VPNC's 15-company roster are publicity-hungry start-ups such as Network Alchemy and Altiga Networks, as well as behemoths Cisco, Microsoft and Intel.

The interoperability information will be provided by the vendors, which Hoffman readily acknowledges will raise a red flag in the minds of network executives and journalists. Yet he's counting on the spirit of cutthroat competition to keep the combatants from fudging their data.

"Quite frankly, they're going to tattle on one another," says Hoffman, who insists he will purge the charts of any bogus claims brought to his attention.

Which means that some companies will look good and others not so good. . . . Count on the latter companies to be not so happy.

"There is a good chance we'll end up with a few arrows in our backs," Hoffman says.

Presuming he doesn't pull punches, these charts should prove to be a valuable resource for the Internet mail and VPN communities. Keep an eye out for them later this year at www.imc.org and www.vpnc.org.

We'll keep you posted on the condition of Hoffman's back.

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**Remember the 16 ISP engineers** who tried to auction their services en masse using eBay a while back? The stunt garnered more press attention than job offers, but it did prompt one of the 16 to start an e-business of his own: an online auction house for IT professionals.

**John Kinsella** believes he has identified a gap in current job search and auction site offerings, even though the biggest name in the online resume game, Monster.com, announced a similar scheme recently.

However, you've got to like the name Kinsella conjured up: **Bid4Geeks.com.**

---

**If your office is anything at all like mine,** you spend a slice of every day mulling questions that might have made for a good Seinfeld episode but really don't help anyone get their work done.

Example: Why do people put those funny sayings at the bottom of their e-mail signatures?

An editor here posed the question after receiving what he considers the funniest of the genre: "Proudly marching to the beat of a different kettle of fish."

The sender was **Ken Beach,** a systems administrator with LDR Industries in Chicago. "I only wish I had thought of it first," Beach says. "I saw it a few years ago at a science fiction convention and have been using it ever since."

Two questions for Buzz readers:

1) Why do you think people do this?

2) What's your favorite e-mail tag — your own or one you've seen.

Drop me a line. If enough of you are willing to waste your employer's time on such a trivial matter, we'll publish the best in a future column.

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e-business

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